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Where Every Joint is an Expansion-Joint

THE joints of this pavement are filled with Barrett's Paving Pitch.

When the bricks contract in cold weather the pitch sinks a little lower in the joints, but never lets go of the bricks nor permits any crack or break in its waterproof seal.

That guarantees the foundation from frost or washout.

When the bricks expand on a hot day there is no pressure against curbs or manholes or street-car rails, for the pitch surrounding each brick is merely squeezed a little and rises slightly in the joints.

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Pitch will last as long as the brick. It is impervious to the attack of water or weather or automobile-drippings.

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TRADE B MARK

Main Street, Lewisburg, Pa. Brick pavement filled with Barrett's Paving Pitch

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is the statement of many Brownhoist users. They have reached this conclusion only after a thorough and comparative tryout of the crane, and this includes practically every class of work.

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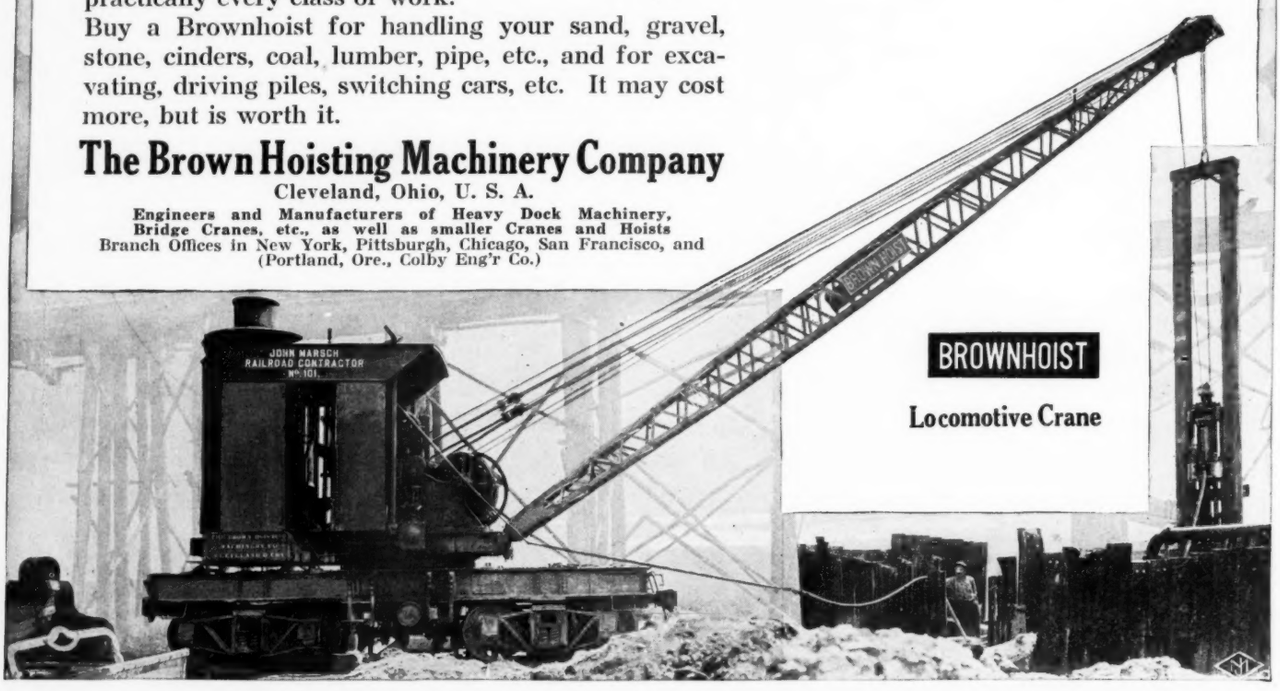

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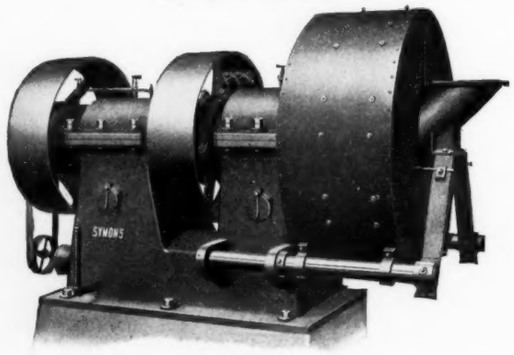

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Municipal Journal

Volume XLIII NEW YORK, SEPTEMBER 20, 1917 No. 12

ROAD MAINTENANCE IN LOS ANGELES

Oiled Streets Plowed Up, Harrowed and Rolled Yearly—Sand and Gravel for Street Work Obtained from the River by a Permanent Drag and Screen Equipment—Mixing Oil and Gravel for Repairs.

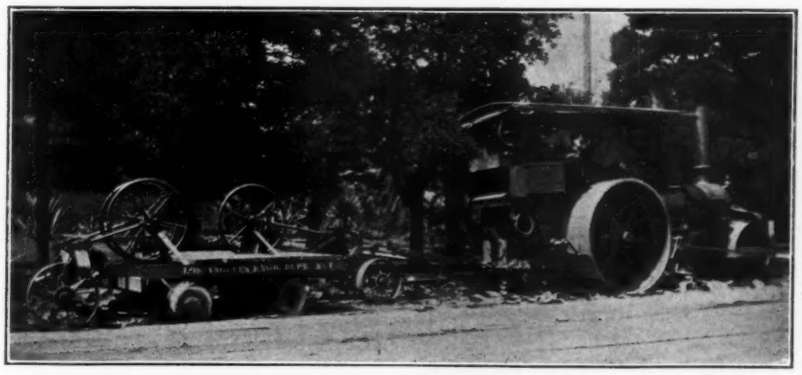
By C. W. GEIGER.

In repairing holes and cuts in the road surfaces of Los Angeles, Cal., made by sewer contractors, gas companies and others, those responsible are required to obtain from the city a mixture of oil with sand and gravel or broken stone and use this for resurfacing. The place to be repaired is left open for a depth of 4 inches below the road surface, and the oil mixture is placed in this to a depth of 6 inches, bringing it 2 inches above the surface. A roller is then run over the patch until it is packed down level with the surrounding surface. Some of the sewer contractors own rollers and do their own rolling, while others hire this done. All the contractors pay the city for the material; the sewer contractors may haul and lay it, but this is done by the city in all other cases.

About once a year the oiled streets are plowed up and a disk harrow run over them. The disk is run over each section about eight times, thoroughly pulverizing it, so as to get it into condition to be surfaced. It is then brought to even surface and rolled until solid. Oil is then sprayed on this surface by the contractor having the oiling contract with the city. Sand is then spread sufficient to absorb the oil, and it is rolled with an 18-ton roller. It is found that, with these roads, very sandy foundations do not stand up well. The street car company takes care of all streets between and for two feet outside their tracks. They dig deep for the foundation of their ties, and because of this, this portion of the street does not require so much attention as that which is under city maintenance.

In plowing up the streets, a rooter plow is used, drawn by the roller. Approximately four blocks 60 feet wide can be plowed up in a day. The disk also is drawn by the roller. Fourteen rollers are in operation continuously except during the rainy season. Each is provided with a rooter, disk, and oil tank wagon, the last for supplying fuel and cylinder oil; all of which are drawn from one job to another by the roller. The oil tank has a capacity of 1,036 gallons of fuel oil. It carries in the rear a duplex pump, operated through a flexible steam pipe by steam from the roller boiler, which pumps the oil into a 120-gallon tank on the roller. Cylinder oil is carried in cans in the rear of the oil tank. On top of the tank is a box for carrying tools, buckets, etc. Three of the rollers are operated by gasoline.

One of the most interesting features of the work is the method by which the city obtains its sand and gravel. Los Angeles river, draining the San Fernando valley, brings down enormous amounts of sand when in flood, while Arroyo Seco, flowing from the mountains, brings large quantities of gravel during floods. At the point where the latter flows into the former the city has built a plant for securing sand and gravel from the river bed, where it is deposited. When the rivers are both flooded, sand and gravel mixed in about the desired proportion are deposited within the reach of this plant; while, when they are unequally flooded, either sand or gravel may predominate and the sand is deposited over one area and gravel over another. The material is brought in from the river by scoops, either one working in the sand deposit and the other in the gravel or, when sand and gravel are properly mixed, the scoops bring in the mixed material. In drawing in the sand, considerable water is of course retained by it, and it is the practice to scoop the sand up above water level during half a day, and then, it having drained out in the meantime, to scoop it the remaining distance into the screen and bins.



ROAD ROLLER (18-TON) DRAWING DISK OVER OILED STREET.

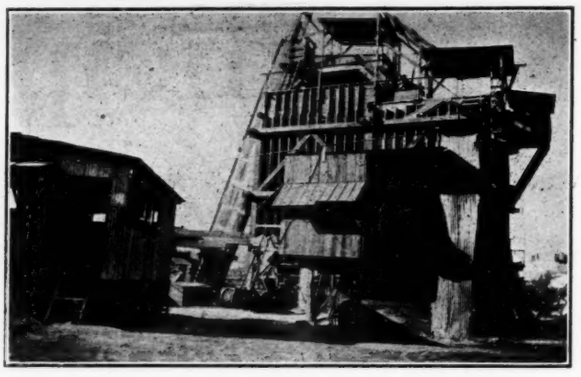
A dead-man is located in the river about 600 ft. from

the plant, to which is fastened a bull-wheel around which passes a 1,200-ft. cable, used for dragging the scoop out into the river. Another cable attached to the scoop draws it to the shore with its load of material. These cables are operated by two drums, driven by a 75 h. p. electric motor. The scoop is operated in one place until it reaches bedrock, which it usually does at a depth of 15 to 30 ft. All of the deposit above the rock is pure sand and gravel. It usually requires about two months of dragging in one spot before bedrock is reached, and the dead-man and bull-wheel are then moved over about 40 ft. and the new area worked with the scoop.

The large gravel and the pieces of rock that are brought in are crushed to a two-inch size by a crusher operated by a 10 h. p. motor and is then screened, as is the mixture of sand and gravel. The fine sand goes into a bin of 190 cu. yds. capacity and is used for resurfacing streets. The coarser material, which consists of about 65 per cent of coarse material and 35 per cent of sand, is deposited in another bin of 175 cu. yds. capacity and is used for mixing with the oil for road repairing.

The boys in the neighborhood of this plant have persisted in swimming in the hole created by the scoop and four have been drowned. It was finally decided that the pool be turned over to the playground department, which placed a life-saver at the pool and erected a building and tent for the boys to use as dressing rooms. This has proved a very popular bathing place and no accidents have happened since the life-saver was stationed there.

The superintendent of the plant has introduced a device of his invention which is claimed to save a considerable part of the oil used in the oil-gravel mixture. In the bottom of the gravel bin is a chute leading to a hopper. When one-half cu. yd. of a mixture of 65 per cent gravel and 35 per cent sand has been run through the chute into this hopper, it is hoisted and dumped into a mixer, together with 6 gallons of oil heated to 280°. The oil is supplied through a flexible hose, on the end of which is a length of iron pipe which leads down into the mixer. The device consists of inserting into this pipe, just below its junction with the hose, a steam pipe with a 3/8-inch opening, this pipe occupying the axis of the larger pipe. When oil is turned into the mixer, live steam is blown through this steam pipe, and this serves to spray the oil into the gravel instead of permitting it to collect in parts of the batch, thus greatly aiding in its uniform distribution throughout the gravel. The superintendent states that since the introduction of this device, 12 gallons of oil mixed with a cubic yard of gravel gives better results than were formerly obtained by the use of 18 gallons.



BINS AND OILED GRAVEL MIXER.

The oil is delivered to the plant at a temperature of 240° and stored in a 3,000-gallon tank. The oil is then raised to 280° by a 10 h. p. steam boiler. A motor and pump with an automatic cut-out forces the oil from the 3,000-gallon tank to a 100-gallon tank located above the mixer.

The plant was built in 1915 at a cost of $6,000 and calculated for a capacity of 80 cu. yds. of sand and gravel per day, but at present it is turning out 200 cu. yds. The capacity of the oil and gravel mixing plant is 160 cu. yds. per day.

SCOOP BRINGING LOAD OF SAND AND WATER FROM RIVER.

A LEAK OF 330 GALLONS PER CAPITA DAILY.

Pulaski, N. Y., has a population of about 1,800. On Monday, August 20, of tis year, the water mains passed a total of 843,000 gallons, the rate between midnight and 5.30 being 780,000 gallons a day. On Wednesday, August 22, the total was 252,000 gallons and that between midnight and 5.30 was 125,000. The difference was not due to Monday being wash day, since it amounted to about 1,700 gallons, or about 100 tubs full of water, for each family.

It had, of course, been realized that the town had not been putting to legitmate use such a large amount of water, and the Pitometer company was asked to investigate. It was found that a 6-inch main was broken entirely across and the 600,000 gallons a day that escaped was entering a sewer and escaping undetected.

ERIE'S GARBAGE DECREASING.

Reference has been made upon two or three occasions in Municipal Journal to the garbage pail as an index of the economy of a city in its food consumption. Since our first editorial on the subject the idea has been taken up by others, and in a number of cities the officials are keeping close watch of the garbage collections to note whether such economy is being practised in their city.

Among these is Erie, Pennsylvania. J. Emil Gross, superintendent of parks and public property of that city, sends us a recent statement with reference to the diminishing garbage in that city. The superintendent of collections, James D. Tracy, about a week ago stated that a decrease was noticeable all over the city, but especially in the wealthiest section. He reported that during July only 596 tons of garbage were collected, while during the same

month of last year 723 tons were collected. This shows a decrease of nearly 18 per cent in amount, although the population has increased, so that the decrease would probably figure nearly 20 per cent per capita.

Although the amount to be collected has decreased, however, more difficulty is experienced in making the collections because of the trouble in retaining laborers. On Monday, August 27, five wagons out of sixteen had to be laid off because the men for driving and collecting had left to work in the factories. It is probably necessary in the present emergency that factory hands be obtained, and the desirability that the citizens diminish the amount of garbage to be collected is thus made prominent by this illustration, such reason for food economy being in addition to the one that the surplus food is needed by America and its allies.

CONVENTION OF THE NEW ENGLAND WATER WORKS ASSOCIATION

Papers, Discussions and Other Features of the Thirty-Sixth Annual Convention at Hartford Last Week—Practical Details of Trenching, Laying Mains, Constructing and Operating Purification Plants—Reports of Committees.

The 36th Annual Convention of the New England Water Works Association was held at Hartford, Conn., on September 11th to 14th, inclusive, and was attended by over 200 members and a number of guests. About 125 active members registered and 90 associate members, and each of the business sessions was well attended.

The society was particularly fortunate in the choice of its meeting place. The majority of the societies of this nature (aside from the three or four largest organizations) ordinarily select some large hotel as its headquarters and hold its meetings in a convention hall provided in the hotel. In most cases these halls are not particularly well adapted to the purpose, especially in the matter of quietness, since street noises and those from elevators and other disturbances in the hotel, and frequently from the adjoining exhibit hall, interfere more or less seriously with the reading and discussion of papers. This convention was held in a church on a quiet street, and there was absolutely no noise to interfere with the meetings, the exhibits being in the basement of the church, while the meetings were in the auditorium above.

Nineteen papers were presented at six sessions and ample time was allowed for the discussion of each. These included all of the papers on the program except three, one of these being the description of the U. S. Army Cantonment at Ayer, the author, Captain Edw. Canfield, Jr., having been called to Washington and thus being prevented from attending the convention.

In the matter of discussion, although, as stated, ample time was allowed, the advantage taken of it was rather disappointing. Had the members made full use of the opportunity, the time allotted for business sessions would have been just about sufficient; but as it was, each of the evening sessions lasted only about an hour and one-half, and the afternoon sessions about two hours. These short sessions had the compensating feature that they gave the members abundant opportunity for the inspection of the exhibits, and during the intervals the exhibit halls were well crowded with interested water works superintendents.

The business sessions occupied the entire day of Wednesday and Thursday; Tuesday afternoon was devoted to the addresses of welcome and the president's address; in the evening a reception was given by the Hartford Chamber of Commerce, and all day Friday was consumed in an inspection by automobile of the new reservoirs and watersheds of the Hartford water works, involving a trip of about 50 miles by automobile.

In opening the convention, addresses of welcome were delivered by Mayor Hagarty, C. H. Clark, editor of the "Hartford Courant"; James T. Berry, acting president of the Hartford Water Board, and others. Following these addresses the president of the association, C. M. Saville, the manager and chief engineer of the Hartford Board of Water Commissioners, gave his annual address.

PRESIDENT SAVILLE'S ANNUAL ADDRESS.

After a few introductory remarks, Mr. Saville spoke as follows:

The New England Water Works Association is a "get-together" organization of men whose principal business is connected with supplying water. Included in our membership are specialists in various matters of water supply, water works operators who are doing the practical everyday work, and manufacturers of water works equipment who provide the materials we use in our work. Each of us is here to help the other and by so doing help the public whom we serve. Men from all parts of the world are on the rolls of this association and to those who know its beginnings and its traditions there is a very deep personal interest in its life and future.

The matter of supplying water is of a different character from that of any other municipal industry. All others primarily are disbursing agencies handling alloted funds. Their principal duties are to see that their funds are honestly and economically expended on pre-determined work.

The water department, on the other hand, is always a commercial enterprise, similar in many of its requirements to other public utilities, as for example the business of furnishing light and power by gas or electricity and the running of steam and electric plants. Here there is a question both of production and distribution with new problems continually arising as to methods of operation and maintenance. Economical and efficient means must be employed to produce an article that will satisfy customers and be delivered to them at fair rates. The plant must be operated in such a manner as to be at least self-supporting. Thousands of consumers must be handled individually with the same regard as obtains in the best conducted retail trade. The demands of a modern water supply system are complex and are concerned with matters little dreamed of a generation ago.

The men who are efficiently handling this work today are trained practical men, skilled in their professional work, single-eyed to economical administration, and alert to recognize, seize and apply the latest developments in water works science.

Today something more is required of the water works executive than to be able to get 480 minutes' work for the price of labor, properly to lay pipe and quickly to repair a break in a supply main. These things are necessary in carrying on the department work, but they are not the essentials of present day management. The water works executive must be familiar with all these, but in addition he must have intimate knowledge of and ability to handle such financial questions as valuation of works and equitable rate making, as well as hydraulic problems relating to supply and construction or the complexed questions involved in providing a water which satisfies modern standards.

Intelligent systems of accounting are necessary. Rules and regulations adjusted to present conditions are required. Scientific purchase of materials and supplies, cost keeping that instructs, modern transportation, checks on the care of department property, and similar matters are all part of the organization of even the mediocre construction company. How can water department business succeed without them? The question of revision of rates to meet existing conditions is most vital to successful operation, but one which is often the last to be taken up, particularly in municipally-operated plants.

Many rate schedules now in use even in our larger cities are inheritances of the past, continued because of the inertia of the present. Some of these are ridiculously in-

adequate and fail utterly to recognize conditions of plant, cost of operation, and special value to different classes of users. Such conditions result in extravagant operation and in ineffectual service.

At the present time it is the trend of opinion, based on judgment of the best sanitary specialists, that all public water supplies sooner or later must be filtered. Water is demanded which is clean and attractive from pollution, removal of turbidity and color, reduction of chemical constituents producing hardness and other detrimental conditions, and the elimination of taste and odor.

These are some of the problems of the modern water works executive. Properly met, they mean efficiency in organization and economy in operation with consequent benefit to the city. To do these things it is necessary that the manager of the water department shall be able to grasp, understand and control adverse conditions which were formerly accepted as inevitable but are now known to be amenable to remedy if not cure.

The past experience of this association with its avoidance of entangling alliances is the best guide we can have for the future. Our present position as a power in water department matters shows clearly the wisdom of the founders of this association in rightly excluding both politics and commerical exploitation from its voting membership. "As with the fathers, so may God be with us."

With other organizations we will work together gladly and we welcome all water works men to our membership. Careful consideration of our own particular needs and purposes, however, forbids any thought of combination with others. In these critical and serious times it is well for us to cultivate the attitude of the open mind and the spirit of co-operation.

One of the most cogent reasons why our manufactured products, up to the war period, had so little market in Central and South America was the arbitrary stand of American producers as to details of construction and methods of packing goods, regardless of the needs of the purchaser. Until many of our manufacturers and consumers, on the one hand, emerge from this attitude of pigheadedness, and on the other step aside from a position of cock-sureness, there will be difficulty in meeting the demands of commercial enterprise and construction possibility. Opportunity is hindered by ignorance and the effect of the small mind, unable to comprehend the standpoint of the other fellow. The talisman of success is "Co-operation." Manufacturers must concede the necessity and be willing to consider with open mind changes in plant, though expensive to them, if efficiency and economy result in construction work.

Engineers and users of manufactured products must recognize business exigencies and matters affecting established industry. They, too, must have the open mind which is free from personal bias, broad in its outlook and dispossessed of a finicky attitude. In the "get-together" atmosphere of this convention let us all try to get into touch with the real reasons for the differences between users and producers and see if we cannot reach some mutually advantageous ground in advance of that on which we now stand.

In these days the direction of the force of gravity as regards cost of labor and materials appears to have been reversed. An efficient way and perhaps the best way to meet this condition seems now to be the more general use of labor-saving tools, careful selection of materials, more thoughtful planning of work and better organization force. Present prices of labor and materials in many cases are beyond that ever before experienced, and the outlook into the future seems to reveal little or no downward tendency. For a short period there seemed to be a faltering in construction work, but contract news, construction advertisements, and bond sales indicate recovery with a tendency to accept present prices as better perhaps than will be afforded later. From this viewpoint, more and more public work of considerable magnitude is being let. With the reduction of labor due to national requirements and the possibility of greater demands for materials, even if peace should come quickly, there seems to be greater chance for increasing cost of work for some time to come.

To consider these problems, gentlemen, is the reason we are in convention at Hartford this week. While we sincerely appreciate and shall heartily partake of all the hospitality and the entertainment offered, business, more perhaps than ever before, should take precedence. For this purpose we are to listen to papers presented by sanitary engineers skilled in special lines, by practical water works operators who are doing things worth while in their own water works departments, and by makers of appurtenances used and necessary in water department work. Valuable as are these papers, more useful yet is the discussion which should arise. Special practical problems are welcomed for solution, for questions that perplex one are sure also to have troubled many others.

At the reception in the evening S. Wales Dixon, superintendent of recreation of the Park Commission, gave a short illustrated lecture on the Hartford park system, showing pictures of the gardens and crowds in the parks during the summer.

WEDNESDAY MORNING SESSION

On Wednesday morning the first paper was one by Geo. A. Johnson, entitled "Rapid Sand Filteration." This paper (an abstract of which will be given next week), was a most exhaustive treatise on the history and development of rapid sand filtration, accompanied by comparisons with slow sand filtration. It occupied 88 typewritten pages and was much abbreviated by the author in reading it, which reading occupied about one hour.

Filter Bottoms and Strainer Systems.—This was followed by a paper by Robt. Spurr Weston, discussing the matter of filter bottoms and strainer systems. Mr. Weston stated that the strainer has to perform the double service of removing water slowly after it has passed downward through the filter and also of admitting wash water at very much higher rates through the strainers upward to the filter. The strainer of the early rapid filters consisted simply of a perforated metal plate. Later strainer heads were fastened in this plate, and the orifices confined to these heads. In these early filters the sand was placed directly over the strainers, but this caused clogging of the holes, and the next step was to place six inches in depth of gravel between the strainer and the sand. In these filters the plate holding the strainers formed a false bottom under which sediment was apt to collect, and to avoid this a pipe manifold was substituted, the strainers being placed in the pipes.

Practically all of the early filters were circular in form and comparatively small of diameter, and washing them was not especially difficult, stirring rakes being quite generally used for loosening the sand. With the introduction at Little Falls of larger rectangular units, some other method of stirring up the sand became necessary and the air wash was introduced, the object of this being to break up the cakes of mud in the sand. This could be effected by wash water alone if it be given high velocity, but such high velocity was found to disturb the six-inch layer of gravel and permit the sand to settle into it. At Cincinnati, air was omitted and a velocity of wash water of 22 inches was used, the mixing of the gravel with the sand being prevented by placing a wire screen on top of the gravel. Twc or three years ago it was discovered that this screen was torn from its fastenings, more or less corroded, and permitting the sand to mix with the gravel, and the screen was removed and instead the depth of gravel was increased to 14 inches, which seems to be effective in preventing the displacement of the gravel. At Harrisburg another plan was tried, that of using a pipe manifold, in the bottom of which fine holes were bored for passing the water. The next development was the Wheeler filter bottom, consisting of inverted pyramidal depressions in a concrete bottom, in which are placed a number of concrete balls. (This bottom, as used in the New Brunswick plant, was described in Municipal Journal for July 26, and the Dayton installation, at greater length, in the issue of May 27, 1915.) Recently a plant has been constructed which has returned to the earlier idea and employs a false metal bottom into which the strainers are screwed. One of these was installed at Erie, Pa., and during the discussion of this paper the superintendent of that plant stated that this filter had been in service for three years and there had been no

trouble with it of plugging or any other kind and that a very uniform wash was obtained.

Mr. Weston, who is perhaps the leading advocate of the Wheeler bottom, gave as its advantages the fact that it contains no metal to corrode, gives perfect distribution over the entire bottom of the filter and requires a depth of only six inches of gravel for small filters, increased to 8 inches for larger units. Its cost of construction was not greater, and was possibly less, than that of the Harrisburg and other types of filters, although the payment of the royalty for the patent would probably make it more expensive. Comparing the false bottom with the manifold, Mr. Weston gave it as his opinion that the former involved dangers of both construction and operation, although it is practicable in small units.

Following this there was discussion of both these papers. In connection with the matter of taste given to water by the use of alum, Mr. Johnson admitted that with the pressure filter and the old alum pot there was likely to be over-dosing with alum and a resulting taste to the water; but stated that with modern plants there was no excuse whatever for taste, which is due to unnecessarily large doses of alum.

Asked whether the pipes of a distribution system should not be cleaned of sediment before filtered water is first run into them, Mr. Johnson stated that both flushing and sterilizing of the mains prior to filtration were more or less common. Mr. Lochridge of Springfield, however, stated that in his opinion such cleaning out was not necessary, as there would be no more stirring up of the sediment by the filtered water than had been the case previously unless there were other changes in the details of distribution. He cited one case in Springfield in which the introduction of filtered water caused a reversal of direction of flow in certain mains and a considerable stirring up of sediment, as a result of which it was decided to flush out the mains. By a proper manipulation of the gates a velocity of 9 feet per second was obtained in the mains and this brought out great quantities of sediment, as much as 1 bushel of solid matter being collected at one hydrant.

A member asking whether it would be practicable to purify and use the wash water, two or three others expressed the opinion that it would be, Mr. Weston citing one case where it had been done; also stating that in Baltimore the wash water was settled in a pond and quite well clarified, although it was not used afterword. W. C. Hawley stated that the Pennsylvania Water Co. uses wash water settled for six hours and finds it better than the raw water. The water is pumped to a considerable elevation before purification and it is therefore an object to waste no more of it than is necessary, and as a matter of fact but one-tenth of one per cent of water is lost in washing.

The matter of maximum color permissible in filtered water was discussed. Mr. Johnson considered 10 parts per million as the maximum which is satisfactory and expressed his opinion that in the majority of cities the color is less than this. The color of raw water in many cases, however, was much higher, being 100 parts or more at all times in some sections, while in the northeast the maximum generally fell between 20 and 40. In his opinion any water that had a color of 30 parts or more should be decolored. Mr. Lochridge stated that Springfield consumers were satisfied with a color of 15, probably because they had never been supplied with a water lower in color. He believed that color satisfaction was largely a matter of local education, consumers being satisfied with 15 parts or even 20 parts if they had never been provided with less.

Operation of Rapid Sand Filters.—The next paper was one entitled "The Care and Operation of Rapid Sand Filters," by John W. Gaitenby, superintendent of filtration at Evanston, Ill. The filter in that city was built in 1914 by the Norwood Engineering Co. Its capacity was about 12 million gallons per day, being calculated for 100 to 125 million gallons per acre per day. Water is taken from Lake Michigan through an intake 1.6 miles long. This water sometimes contains sewage when the winds and currents are unfavorable, and varies considerably in other kinds of pollution depending upon the direction of the wind. Since January, 1916, there have been no typhoid deaths in the city. The rate of pumping varies from 3,000,000 gallons to 17,000,000 gallons per day. Venturi meter readings are taken each hour. In order to insure the use of proper amounts of chemical, the filter operator is notified by the engineer whenever the rate of pumping is to be changed. The quality of the lake water being nearly constant at all times, the amount of dose is varied with the quantity only of the water.

Once a week each bed is emptied of water and examined, and stirred up to remove mud balls or patches. This stirring is done by use of a rake made by the department, which consists of a piece of maple about 16 inches long in which are set 6 or 8 teeth, each of which extends a few inches from each face of this maple stick; bolts being employed at the two ends of the stick to prevent its splitting along the line of the holes in which the teeth are set. At right angles to these teeth, in the middle of the stick, is another hole in which is inserted an iron pipe handle, on which the rake is held by two nuts on the pipe, one above and the other below the rake. Just enough wash water is turned into the filter to make the sand semi-fluid, and the rake is then moved up and down and forward and back across the filter by men standing in the filter troughs. When these feel an obstruction, indicating the presence of a mud deposit, they work the rake vigorously here and so break up the deposit. After this raking, the filter is washed for a period three times as long as usual and is then emptied of water and the top of the sand and all exposed parts are sprinkled with chloride of lime. After a few minutes the filter is again washed to remove the chloride of lime and is then put into service. Although air is not used at Evanston, Mr. Gaitenby believes that it agitates and cleans the sand more thoroughly than does any practicable velocity of wash water.

During 1916 the average bacterial efficiency of the filters was 99.86. The amount of wash water used in 1915 was 3.68 per cent of the water filtered, and in 1916 was 2.92 per cent. The cost of operation in 1915 was $3.96 per million gallons, not including interest or depreciation, and was $3.80 in 1916, in spite of the fact that in the latter year the cost of both alum and hypochlorite had doubled.

In applying the hypochlorite, this was made in a weak solution of 0.1 per cent, it being believed that the use of such weak solution greatly reduced the probability of variations in the dose from the desired amounts.

Another item of operation in Evanston was the addition of clay to the raw water to increase the turbidity artificially from 10 to 30, since it was found that with the higher turbidity the vegetable organisms in the water could be settled out much more thoroughly. The length of run of filter between washings was increased in this way from 4 hours to 48 hours, when the water was high in such organisms.

Following this paper, the society by unanimous vote expressed its appreciation of the reception given by the Chamber of Commerce the night before. The Committee on Award of the Dexter Brackett Medal then announced, through M. N. Baker, that the medal for the past year had been awarded to C. M. Saville, for his paper presented last year entitled "Some Water Works Ex-

periences in Hartford, Conn." The other members of the committee were Desmond, Fitz Gerald and Alfred E. Martin, superintendent of Springfield, Mass., water works.

WEDNESDAY AFTERNOON SESSION

Regulating Private Water Companies in New York.—Following the election of two new members to the society (one of whom was a visitor from Petrograd, Russia), Delos F. Wilcox, deputy commissioner, Department of Water Supply, Gas and Electricity, New York City, read a paper entitled "Regulation of Private Water Companies in New York City." Several of the communities absorbed in the combination which now forms Greater New York were served by private water companies, and their franchise rights, of course, continued under the new condition. What control the city or any city or state commission has over these private companies is a matter concerning which there is some doubt, since up to date only one suit has been brought which gave the courts an opportunity to pass upon this question. Fairly successful and adequate control is maintained by the city through moral suasion and mutual agreement with the companies, this control including the matter of rates as well as securing extensions into new territory whenever this becomes desirable. Probably the most weighty argument which the city advances in securing acquiescence of the companies in its requests is the right which it possesses of duplicating the private mains and introducing municipal service in the territories now served by private companies. The city has acted upon the principle of not imperiling the value of the property of these private companies by municipal competition, although it retains the right to do so should the company refuse to render such service as the city thinks to be requisite.

The matter of rates is a difficult one to solve with justice to all concerned, especially in view of the fact that the private companies obtain their water from wells and must pump it to standpipes, while the city's supply is all obtained by gravity. The general method followed is to adjust the rates so that an adequate income may be derived upon a value of property based upon reproduction value of plants less depreciation, with due consideration of the fact that in many cases the mains are rapidly becoming too small for adequate service and so are subject to high obsolesence, which also is true of the pumping plants and wells. As there are no reservoirs and the obsolesence on the mains is high, the general depreciation rate used is higher than that adopted in most cases. No allowance is made for any franchise value—as a matter of fact such value exists only at the pleasure of the city.

In order to give a greater certainty of fire protection to the districts served by the private companies, the city has connected the municipal distribution system with the private supply in case of need, placing a sealed valve in each connecting link. In some cases these have been used to supplement the private supply under other conditions. On the other hand, the city purchases water from the private companies for municipal purposes such as use in municipal buildings, street cleaning, sewer flushing, etc.

The next paper was one entitled "Water Rate Revision in Waltham, Mass.," presented by Bertram Brewer, the city engineer and superintendent of sewers and water works of that city. This paper is published in full elsewhere in this issue.

Experiences with Trench Machines.—The next paper was one not contained in the program, entitled "Experiences with Trench Machines," by Geo. W. Batchelder, water commissioner of Worcester, Mass. Worcester in 1914 purchased an Austin trench machine for digging trenches for city mains. The machine was used that year for digging a trench 6 feet deep for a 36-inch pipe. As the trench was about two feet wider than the width dug by the machine, the side banks were broken down with bars used from the surface, the dirt so thrown into the trench being removed by the excavation buckets. This machine handled with great ease the gravel which constituted the soil in this trench, and also the sand excavated in a succeeding job. In fact, the rate at which the excavation was performed was so much faster than that at which the pipe could be laid that the machine was used only a few hours a day. Later the machine was used for trenching for a 42-inch pipe, in which case also it was necessary to break down the sides of the trench to secure the necessary width. Later the machine was used for excavating a considerably deeper sewer trench in hard clay. Mr. Batchelder said that this machine can be used where there are house connections, although the necessity to avoid injury to these in excavating interferes with the ease of operation.

At present the chief difficulty with the machine is to find sufficient work for it. In the average soil of Worcester it will dig a trench 5 feet wide and 6 feet deep at the rate of 1½ feet a minute. Operation requires 90 to 100 pounds of coal per hour and an operator and fireman on the platform and one man in the trench to direct operations, with others to widen the trench by breaking down the banks when this is necessary. At the present time this machine has been rented to the city of Hartford for laying a 12-inch cast iron pipe.

Worcester is also using a back-filling machine consisting of a boom and scoop bucket; the bucket is drawn out by two men to the further side of the bank of excavated material and is then drawn to the trench by the cable and boom. Three men handle the back filler and easily perform all the back filling for even the largest trench.

Northampton's Water Works Shop.—H. W. Hosford, city commissioner of Northampton, Mass., then described the new water works shop which is being built by that city. The shop consists of a two-story and basement building in which are located offices, repair shops, stock rooms, etc., and also a one-story annex containing garage and store house for cast iron pipe and other large stock. This building is estimated to cost $29,000 complete, including the machinery and all appliances.

WEDNESDAY EVENING SESSION

The evening session was shorter than had been anticipated because of the inability of Capt. Edw. Canfield, Jr., U. S. A. Constructing Quartermaster, to be present to describe the organization for building the United States army cantonment at Ayer, Mass., Capt. Canfield having been called unexpectedly to Washington.

Operating Details at Windsor, Conn.—A paper describing "Some Operating Problems of a Small City Department" was read by Homer R. Turner, superintendent and engineer of the Windsor Fire District. The town of Windsor having refused in 1910 to purchase the plant of the Windsor Water Co., in 1915 the thickly populated part of the town incorporated as the Windsor Fire District and purchased the plant of this company. It proceeded to extend the distribution system, install fire hydrants throughout the district, to enlarge and improve the pumping equipment and to erect a steel standpipe. The paper deals with a few problems which arose in operating the plant and the method of meeting them.

The water is impounded in a reservoir with a capacity of 15½ million gallons which drains an area of about two square miles devoted largely to tobacco raising. In January, 1917, for the first time positive tests for B-Coli were obtained and in June the commissioners authorized the installation of a liquid chlorine disinfection plant, which was installed by Mr. Turner under the direction of James A. Newlands, chemist for the water department, and the

water is now being treated with chlorine at the rate of 0.6 part per million. Tests show a reduction in all bacteria of 85 per cent, with entire elimination of B-Coli.

During July of this year disagreeable odors were noticed in the water and an investigation showed that large masses of spirogyra had become caught on fixed growths in the shallower portion of the reservoir bottom, which, on decomposing, had produced the odors. The condition became rapidly worse and within twenty-four hours the odor had permeated the entire reservoir. The writer decided immediately to drain the water from the reservoir and pump the supply from the brook above the reservoir. In this way it was possible to leave the bed of the reservoir exposed to air and sunlight, thus permitting the decomposing matter to oxidize more completely and obtaining water which was comparatively fresh and free from odor. The benefit of sedimentation of the pollution was lost, but the chlorine treatment eliminated all danger. After the reservoir had been treated for ten days, the offensive matter was sufficiently oxidized to permit the filling of it again.

The private company's pumping equipment had consisted of two Rife rams and an 8 x 12 Gould's triplex pump direct connected to a 10 h.p. gasoline engine. As the storage capacity of the reservoir was less than one day's consumption, additional pumping equipment was essential for fire protection. A 10 x 12 inch Smith-Vaile triplex pump was substituted for the ram, operated by chain drive by a 100 h.p. Westinghouse slip ring motor. As this unit was to be used but three or four hours a day, automatic operation was provided in case of emergency or extreme low pressure. For this purpose there was installed a Westinghouse alternating-current magnetic switch starter controlled by a pressure gauge switch. This switch is satisfactory for starting the switch on low pressure, but experience has shown that it will not operate within close limits for stopping the pump when the standpipe is filled. A positive action float switch which can be installed in the top of the standpipe will prove the only satisfactory method of automatically controlling the apparatus.

At first the chain drive gave trouble because the lubricating oil which was dropped upon the top of the chain was thrown off by the high speed without penetrating the link joints. This difficulty was overcome by applying the oil to the inside of the bottom chain through a perforated ½-inch pipe, the centrifugal force working the oil out through the links.

When drawing up proposals for the water mains, alternative prices were asked for using lead and leadite in making the joints. The contractor to whom the work was awarded offered to use leadite for ten cents a foot cheaper than lead joints, and after favorable replies has been received from several users of leadite it was decided to use that material and it was employed upon 28,000 feet of 10-inch main. Certain precautions were found necessary in using it, such as the necessity of keeping the temperature just right, of insuring the absence of oil or grease from the jute used or the bell of the pipe, and the necessity of building the pouring gate at least 3 inches higher above the bell than would be necessary for lead; the last being because the material is too light to flow back into the joint at the top of the bell without a slight head. The leadite in the gate can be broken from the joint when cold and remelted. It was found that better results were obtained if the pouring was kept at least four lengths of pipe back of the laying gang, since the shock of driving home a new length of pipe tended to break a freshly made joint. "One serious disadvantage in the use of the material is its tendency to crack, being brittle on new work. One 6-inch pipe crossing under a railroad track which was laid in 1914 has broken down at the joints and it has been necessary to cut out the leadite and use lead in this location. Another disadvantage in repairing a defective leadite joint is the necessity of shutting the water off the main. It has been found impossible to caulk or patch a leadite joint with lead wool or other material. Best results are obtained by entirely removing the leadite from the joint and repouring the joint with either leadite or lead. On the other hand, the ease with which plugs can be cut out or joints cut away in order to remove several lengths of pipe has proven a distinct advantage."

The standpipe was not complete when the pipes were laid and therefore the joints were not tested at that time. Final tests by the writer were made this year by shutting off all service connections at the curb and all gates on connecting lines. No doubt some water leaks through these curb connections and gates, but even after allowing for this the test showed up well. The standpipe was pumped full of water, which gave pressures of from 45 to 70 pounds on 35 per cent of the mains and 70 to 98 pounds on 65 per cent. Water was fed from the standpipe to the system by a by-pass around a closed gate, on which by-pass was a one-inch meter. Gauge readings of the pressures on the line were taken at two points during a test, which lasted 4 hours. During this time water passed through the meter at the rate of 1,861 gallons per 24 hours or 0.360 gallons per 24 hours per lineal foot of joint.

A paper was then read by William Haine, of the Newlands Sanitary Laboratory, entitled "The Control of Microscopic Organisms in Water Supply." (An abstract of this paper will be given in a later issue.) In discussing the paper, superintendent Gear of Holyoke, stated that he had used chloride of lime for killing algae in a reservoir with good results. In discussing the effect of swamps and lagoons connected with or draining into a reservoir in developing algae therein, Mr. Haine suggested the spraying of such swamps and lagoons with copper sulphate by means of a spray pump, it being impracticable to apply the copper by the ordinary method of dragging it through the water in a burlap bag.

Universal Pipes in East Hartford.—The final paper of the evening was one scheduled for Thursday afternoon entitled "Experiences with Universal Joint Pipe," by John H. Walsh, superintendent of water works, East Hartford. The first pipe of this kind laid in East Hartford was in 1908, when 1,800 feet of 4-inch pipe was laid, since which time approximately 45,000 feet of 4, 6 and 8-inch pipe of this kind has been put into service. The line first laid has been in use for nine years and the records show that there has been no expense whatever for repairs that were caused by any deficiencies in the pipe itself. In January, 1909, the new line froze near the end, and as thawing it out would be very expensive and the four consumers affected had wells that they could use, nothing was done until the latter part of February, when a warm spell came and thawed the pipe, and then trouble began. One Sunday morning Mr. Walsh was called to this point by report of a bad leak and drove to it, five miles away, carrying two lengths of 4-inch Universal pipe. He found that one length of pipe was cracked in the middle for a length of 18 inches. Water was shut off from the line and three lengths of pipe, or 18 feet, were uncovered and in one hour water was turned on again. Bolts were taken out of the joint at the ends of the burst pipe and loosened in the next joint each way, and the broken pipe was raised until the ends came apart. The new pipe was then set in place and lowered to proper position and the bolts tightened. This illustrates the ease with which repairs to this kind of pipe can be made.

Any ordinarily intelligent laborer can learn to lay this pipe in a few hours. To lay 4-inch pipe, four men are used, two to get the pipe ready and two in the trench to

lay it and bolt it. On 6 and 8-inch pipe six men are used. On several 4-inch lines Mr. Walsh has laid 600 feet in eight hours with four men. Since 1908 several improvements have been made in this pipe, such as bracing the lugs and strengtening the bell end of the pipe. It comes in various lengths from 1 foot up to 6 feet and all kinds of bends, tees, crosses and drop offsets that are used in laying water mains can be obtained. Mr. Walsh believes that his department was the first one to call for drop offsets.

A line of 4-inch bell and spigot pipe that passed under a web of trolley switches and tracks gave considerable trouble from burn-outs caused by electrolysis. One hundred feet of this was removed and Universal pipe substituted and in the five years since then no repairs of any kind have been required at this point.

In rounding short curves Mr. Walsh uses a short length, say 2 feet, then a 6-foot length and as many 3-foot lengths as are needed to make the turn. Before testing the pipe at curves, it is braced against the side of the ditch with flat stones placed about 6 feet apart, which are left in permanently. In laying pipe, it is tested before covering, water first being turned in under the regular pressure and the gate then being closed and a pump used to raise the pressure to 100 or 200 pounds and keep it there until every joint is thoroughly inspected, when the pressure is gradually lowered.

The soil of East Hartford is mostly sand and considerable tunneling is done in laying pipe along macadam roads. The practice is to dig 8 feet and leave 4 feet, and by using a 6-foot measuring pole it is possible to bring all the joints in the open ditch. In crossing under improved concrete or any kind of tarred road up to 25 feet in width, the pipe is always laid in tunnel. Sufficient trench is opened up each side of the crossing to take in the length of pipe required to cross the road, and the pipes in this length are then bolted up tightly together, both ends plugged, the pipe filled with water and tested under the pressure. The water is then drained out, a rope is passed under the street through the tunnel, a block and fall is used and the pipe pulled through and bolted to the end of that already laid.

In laying the pipe, Mr. Walsh uses clean grease on the joints, commenting on which Mr. McKenzie stated that he uses pipe paint on the joint, having laid about 25,000 feet in this way.

Following this, the convention adjourned until Thursday morning.

THURSDAY MORNING SESSION.

The entire Thursday morning session was devoted to papers describing Hartford's waterworks system, which were read by six members of the engineering staff—W. E. Johnson, division engineer; Frank Brainard, assistant engineer; H. W. Horne, division engineer; R. E. Wise, designing engineer; H. W. Griswold, assistant engineer, and J. E. Garrett, office engineer. These engineers gave in their several papers a history of the works, a description of the distribution system and descriptions of the engineering and contracting features of the works connected with the new supply which are now nearing completion. A synopsis of these papers will be presented next week.

THURSDAY AFTERNOON SESSION.

This session began with a paper by J. L. Jackson, member of the Advisory Council of the State Department of Health, entitled "The Pollution of Streams in Connecticut." Mr. Jackson, in connection with his paper, showed a number of lantern slides illustrating pollutions along the rivers in Connecticut, most of them individual or by manufacturing plants, but producing in the aggregate a large and alarming amount of pollution.

F. L. Cady, bacteriologist of the Providence, R. I., Water Department, then read a paper (postponed from Wednesday morning) entitled "Methods of Operation and Results Obtained with Slow Sand Filters." The Providence filters have been constructed and in operation for some years, but Mr. Cady brought out a number of interesting details in their operation. Among these was the use of liquefying pipes in the sand ejectors used from the beds to the sand washers. Another was the use of wooden nozzles in these ejectors. The iron pipes in the ejectors were found to wear off rapidly at the outlets, and 1 inch wooden plugs were driven into the holes, a hole being drilled through the center of each plug so that it acted as a nozzle. The life of these was found to be considerably greater than the original construction.

Following this was a paper by S. E. Killam, superintendent of pipe lines and reservoirs of the Metropolitan Water Works, Boston, giving "The Results of the Use of Meters in the Metropolitan Water District, Boston." An abstract of this paper will be given in a following issue. In discussing it, one of the members asked what was considered the least amount to which the night consumption could be reduced, in reply to which the opinion was expressed that it was not practicable on the average to get this below 50 per cent of the 24-hour consumption; part of this being legitimate use, but probably the greater part being composed of an infinite number of minute leaks in service connections, joints and elsewhere which were too small to make it practicable or economical to locate and stop them individually.

Although it was now but four o'clock all of the papers on the program had been read and the meeting adjourned until the evening session.

THURSDAY EVENING SESSION.

This session had been set aside for the reports of committees and a general discussion on the use of different materials for water mains or any other subjects suggested by the members. The report of the Committee on Water Consumption was read by the chairman, Edward S. Cole, and was accepted and adopted. This committee had acted jointly with a similar committee appointed by the American Water Works Association in adopting a standard form for water consumption statistics. The report was the same as that previously presented to the American Association and published in MUNICIPAL JOURNAL of May 24th.

Mr. Richards then read a brief discussion of present conditions relative to labor and materials in municipal work. He estimated that labor had advanced 40 per cent and the value of the service rendered had decreased 50 per cent. Also that tools and materials had doubled in cost. He also believed that all available money, skill and energy should be used for war purposes and therefore moved that it be given as the sense of the convention that cities postpone all work not necessary now, which motion was carried.

Following this the society by a standing vote expressed its thanks to the officials and citizens of Hartford for the entertainment of the members during the convention.

The Committee on Revenue Derived from Fire Service submitted a report which was received and the committee continued. It cited the decision in the Portland Water District case which it considered a very important one, especially that part of the decision in which the court held that every consumer should pay for what he receives, since what he does not pay for, others must. If this idea should be embodied in water rates in all cities it would mean a radical revolution in many of them. Important also was the decision that any one operating a factory or conducting any business in which there is a special fire risk owes it as his duty to the community to take special fire precautions, and the cost of

such precautions should be borne by himself and not by the community; and that failure to provide such precautions is as indefensible as a public nuisance of any kind. The only logical conclusion from this court opinion is that cities should charge for all private fire services.

The meeting was then opened to discussion of pipe materials and the courtesies of the floor were extended to non-members during this discussion. At the invitation of the president, a representative of the Lock Joint Pipe Company, Geo. C. Bartram, gave a brief statement of the use of that kind of pipe for water mains under heads up to 100 feet. The first installation was in Baltimore, where the pipe was used up to a 75 feet head. At Winnipeg six miles are now under construction where the pressure runs up to 45 pounds. The speaker believed that 100 to 125 feet was the maximum head under which the pipe would be economical, since a greater pressure than this would require so much steel reinforcement that an all-steel pipe would be cheaper. At present prices of steel and cast iron, however, and under moderate heads, this pipe costs only about half as much as steel or iron. It is not practicable for distributing systems, since it cannot be tapped for service connections. Concerning the manufacture, the speaker stated that the cement was mixed 1:1½:3 and no waterproofing material of any kind was used, their experiments having indicated that a rich concrete was cheaper that a 1:2½:5 concrete containing sufficient waterproofing to make it tight, besides being stronger. The concrete was mixed fairly wet in order that it might flow around and adhere to the reinforcement, although not fluid by any means. The laitance which floated to the surface was allowed to overflow the side of the form and so was removed from the pipe. A richer mix was used for a few inches at the bottom and top of the pipe.

Another speaker described the use of welded steel pipe with bell and spigot joints. This pipe he claimed had been shown by test to carry 20 per cent more water than cast iron pipe of the same diameter. Some lines had been in service for thirty years and showed little tuberculation. The coating of the pipe was an important feature but was now well understood. The speaker recommended covering the first outside coat with a fabric and this again with asphalt. Little trouble had been experienced with the inside of the pipe if it had been properly dipped. He cited a pipe laid thirty-one years in Butte, in which there had been but six failures and another laid in Colorado Springs twenty-five years ago in which there had been no failure.

The advantages of cast iron pipe for house connections were presented by H. Y. Carson, who stated that, as compared with thirty-years for welded steel pipe, cast iron could show a life of more than 200 years. There was practically no danger of cast iron pipe failing by rusting. As to cost, he stated that 2-inch cast iron pipe would cost no more than 2-inch lead pipe laid as a house service, and would be less liable to be stopped with sediment and more easily cleaned in case of stoppage.

No further discussions of the pipe question were offered, nor were any other subjects suggested for discussion and the convention thereupon adjourned.

The only remaining feature of the convention was the inspection of the new construction work being carried on by the Hartford Water Commission, which inspection was made in automobiles and occupied practically all of Friday.

EXHIBITS AT THE CONVENTION.

Exhibits were displayed in the basement of the church in which the convention was held and a few in the yard outside. The exhibit hall was rather crowded with exhibits, but especially with interested and inquisitive superintendents busily examining them. The exhibitors were as follows:

American Bitumastic Enamel Co., New York.—Pipe coating. American City, New York.—Copies of publication. Builders' Iron Foundry, Providence, R. I.—Venturi meters; Globe castings. Central Brass Co., Cleveland, O.—Brass goods. Central Foundry Co., New York City.—Universal cast iron pipe. Chapman Valve Co., Indian Orchard, Mass.—Brass goods. Chicago Pneumatic Tool Co., Chicago, Ill.—Air hammers. Joseph Dixon Crucible Co.—Paints, lubricants and pencils. East Iron and Machine Co.—Waterworks equipment. Eddy Valve Co.—Valves and hydrants. Electro Bleaching Gas Co., New York.—Water sterilizing apparatus. Engineering News-Record, New York.—Copies of publication. Fire and Water Engineering, New York.—Copies of publication. Hersey Mfg. Co., South Boston, Mass.—Water meters. Kennedy Valve Co., Elmira, N. Y.—Valves. Leadite Co., Philadelphia, Pa.—Pipe joint compound. Lead Lined Iron Pipe Lead lined wrought iron pipe. Lock Joint Pipe Co. Alexander Milburne Co.—Portable carbide lighting equipment; 10,000 candle power light. Mueller Mfg. Co., Decatur, Ill.—Brass goods. Municipal Journal, New York.—Copies of publication. National Meter Co.—Water meters. National Water Main Cleaning Co., New York.—Cleaning equipment and incrusted mains. Neptune Meter Co., New York.—Water meters. Norwood Engrg. Co., Florence, Mass. Pitometer Co., New York.—Pitometers. Pittsburgh Meter Co., Pittsburgh, Pa.—Water meters. Pratt & Cady Co., Inc., Hartford, Conn.—Valves. S. E. T. Valve Co., New York.—Valve boxes. Chris D. Schramm & Son, Philadelphia, Pa.—Air compressors, etc. A. P. Smith Mfg. Co.—Tapping machine. Thompson Meter Co., Philadelphia, Pa.—Water meters. Union Meter Co.—Water meters. United Brass Co., Cleveland, O.—Brass goods. U. S. Cast Iron Pipe Co., Burlington, N. J. Wallace & Tiernan Co.—Chlorinating plant. Warren Foundry & Machine Co.—Cast iron pipe. Waterworks Equipment Co., New York. R. D. Wood Co., Philadelphia, Pa.—Hydrants and valves. Worthington Pump and Mach. Corp., New York.—Water meters and pump.

RATE REVISION IN MUNICIPAL WORKS.*

By BERTRAM BREWER.†

In every community the question of water rates is always a predominant one. Sometimes it reaches a critical stage, as it did in Waltham a few years ago.

It goes without saying, therefore, that every Water Board or Superintendent of Water Works should be thoroughly well informed as to all the fundamental facts of his system having a bearing on the rates. It is often wise to publish a report of the facts concerning this question for the benefit of consumers, and it is always wise to keep ahead of public discussion of rates and keep the public well informed from time to time of conditions and facts which bear on the subject, so as to guide it if possible toward a sound judgment. A study of the rate question and a printed report of the same was published by the writer in 1915 for the Waltham Water Department, and this description of the way in which it was done is offered as a good method of treating the problem in municipally owned works and with the hope that it may be of use to someone.

RATE FIXING IN WALTHAM, MASS.

It was decided at the outset that the period to be forecasted should take in the succeeding five years. The Waltham case was much simplified by the fact that the works are not only municipally owned, but that the City has, fortunately, in the main lived up to the principle that its water works are held by it in trust for the people, and has therefore given the water takers the benefit of any surplus of receipts over expenditures by reducing the cost of water from time to time to those who pay for and use it.

The use of city water for public purposes had for several years been cared for by a charge for all public use of

*Paper before the New England Water Works Association.
†City Engineer and Supt. Water Works & Sewers, Waltham, Mass.

water, except drinking fountains and watering troughs, together with a levy of the nominal sum of $5.00 annually for each public hydrant. Supplies for private hydrants and for fire protection purposes have always been furnished free, the owner paying the entire cost of installation. The question of the fairness of this deal from a financial point of view was not considered in the 1915 investigation. It had proved satisfactory to all parties for several years and the fact that the Department has never paid taxes to the city pretty nearly evened up the obligation. With this phase of the question eliminated and granted that the consumers ought to receive the full benefit of their co-operative venture, the investigation, which covered the five years succeeding 1915, and as many preceding years as was necessary to help in forecasting the future, was begun along the following lines:

1st.—A complete estimate of the reproduction cost of the entire system was made.

2d.—Figures were prepared to show in detail all expenditures for the preceding five years, classified and tabulated so as to show their relation to future expenditures. A chart was prepared showing the growth of population in Waltham. Other charts were made showing the quantity and quality of the water from year to year for a long period. The Waltham supply is a ground water taken from two large wells near the Charles river.

3d.—The effect of metering on revenue and consumption was also especially studied for the preceding five-year period, as this was a very uncertain element in any estimate of future revenue. Up to 1915 less than 40% of the services were metered.*

With all these facts fully investigated and at hand, certain assumptions for the future were made. For one thing it was assumed that metering would be rapidly continued so as to be entirely completed at the end of the five-year period under consideration; and again, that such metering would result in some reduction in the per capita consumption. In 1913 the consumption was 91 gallons per person, with 25% metered, while in 1916 it was 76, with 41% metered. We believed that this figure should certainly be cut to 65 by the end of the next five years.

The next step consisted in forecasting probable future expenditures, both ordinary and extraordinary. In Waltham these consisted of the following:

1. Installation of and repairs to services.
2. Operating expenses, pumping, care of real estate, reservoirs, mains, gates, hydrants, etc.
3. Fixed charges.
4. Extension of metered services.
5. Replacement of mains.
6. Higher service for the higher part of the city.
7. Additions to the collecting works to provide for a larger supply.
8. Extension of mains.

In order to ascertain how much profit or loss the next five years would bring, a careful estimate of income on the basis of existing rates was made. Investigation of past experience seemed to indicate that the income from metered services averaged 90% of what it had been under fixture rates, and this percentage was used as a basis for estimating that portion of the income as the fixture-rate services should be changed over to metered. The remainder of the estimate was comparatively simple.

The estimate of income consisted of the following items:

1. Income from fixture rate services.
2. Income from existing metered services.
3. Income from existing fixture rate services changed over to metered.
4. Income from new services.
5. Income from a new high level supply.
6. Income from installation of services, repairs, etc.

Perhaps it would make it clearer to insert at this point the table just as it appeared in the Waltham report, illustrating the results of this particular study as it was expressed in figures for the Waltham city government.

CITY OF WALTHAM, MASS., SPECIAL REPORT ON WATER RATES.

Estimate of Total Operating Expenses, Including Fixed Charges for Years 1916 to 1920.

	1916.	1917.	1918.	1919.	1920.
Ordinary operating expense	$38,000	$38,500	$39,500	$41,500	$42,000
Meter installations	6,000	6,000	6,000	6,000	6,000
Renewals to improve circulation	2,000	2,000	2,000	2,000	2,000
Extension for high service (fixed charges on $50,000, 30-year loan)	....	....	....	5,000	4,880
Additional supply (fixed charges on $21,000, 5-year loan)	5,840	4,640	4,480	4,320	4,160
Installation of services and repairs	5,560	5,651	5,742	5,833	5,924
Fixed charges on existing debt	24,505	23,795	21,795	13,407	10,362
Fixed charges on an expenditure of $8,000 annually for extending street mains	....	2,320	4,560	6,720	7,800
	$81,905	$82,906	$84,077	$84,780	$83,126
Contingencies, 5 per cent	4,095	4,145	4,204	4,239	4,156
	$86,000	$87,051	$88,281	$89,019	$87,282

Estimate of Income for Years 1916 to 1920.

	1916.	1917.	1918.	1919.	1920.
Fixture rate service	$38,220	$28,666	$19,111	$9,555	....
Present metered service	42,410	42,410	42,410	42,410	$42,410
Present fixture rate services changed to metered, including rental	8,585	17,170	25,755	34,340	42,925
New services (metered, including rental)	1,909	3,818	5,726	7,635	9,544
High level supply, new services	....	....	....	400	450
Installation of services, repairs, etc	2,873	2,919	2,966	3,012	3,058
	$93,997	$94,983	$95,968	$97,352	$98,387

Excess of Estimated Income Over Expenses.

1916.	1917.	1918.	1919.	1920.
$7,997	$7,932	$7,687	$8,333	$11,105

It will be observed that the estimate showed a surplus of income over expense. Definite recommendations were accordingly made looking to a small reduction in income. The reductions were intended to apply to certain charges which the water takers found most annoying, as, for instance, an annual charge of 10% of the cost for the meter and its installation in every case. It was also recommended that the city assume the duty of installing supplementary meters in multi-tenement houses, if the owner would arrange the piping so that all meters could be set near together in one cellar.

The report was not published until 1916 and its recommendations were not carried out until the year was half gone, so their effect was not very apparent up to the end of the financial year 1916. Work on the extension of the supply has not yet been begun. It proved to be a bigger problem than was anticipated and may cost a large amount of money. All this, together with a large saving in operating expenses due to a new and business-like administration of affairs, rather upset the estimates and the department had a larger surplus than was anticipated on January 31 of this year. Just as soon as a definite policy in regard to a more adequate supply can be adopted, it is intended to apply the elements of the 1915 study to the new conditions and adjust prices accordingly.

SUMMARY AND CONCLUSIONS

An enormous amount of literature has been published relative to rate fixing, much of it very complicated and full of perplexities to the average mind, even among men familiar with water works administration. The problem in a municipally owned plant is fortunately comparatively simple—mainly to make the returns commensurate with the expenditures.

(To be continued.)

*For a discussion of the information obtained by this study, see an article by Mr. Brewer in Municipal Journal for May 3, 1917.

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Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

TECHNICAL STUDENTS AND THE WAR.

Enlisted men (or boys) under 21 years of age who interrupted their courses in technical schools to enlist in the army or navy are being given leave of absence by the government to return and finish their studies, it being believed that by doing this they will serve their country better than by going to the front. It follows that those technical students who have not enlisted can most patriotically perform their duty to their country by remaining at home and completing their course. It is not so picturesque or exciting, but it is placing their ability and past training where it will do the most good.

Ideas of men whose opinions will be admitted by all to be more worthy of consideration than those of any others in the nation are quoted below:

There will be need for a larger number of persons expert in the various fields of applied science than ever before. Such persons will be needed both during the war and after its close. . . . I would particularly urge upon the young people who are leaving our high schools that as many of them as can do so avail themselves this year of the opportunities offered by the colleges and technical schools, to the end that the country may not lack an adequate supply of trained men and women.—President Wilson.

Let the young men of America devote themselves to the various branches of engineering education, so that when this war is over the call will not be in vain to young men who have had the training and have learned the lessons necessary to enable them quickly and rapidly to play a part in that great reconstruction enterprise.—Secretary of War Baker.

This cataclysm of war must not be allowed to disorganize our structure for all time, and one of the things we will need after the war, just as we have needed it before the war, just as we are needing it today, will be trained young men to take the place of the older who go out.—General Wm. N. Black, Chief of Engineers, U. S. Army.

Boys should remember that they are now serving in the best possible way by preparing themselves to serve more efficiently when the time comes. . . . It is a great mistake for partly educated young boys to rush to the colors now. We don't need them. It is very important they should finish their education.—Major-General Leonard Wood.

It is especially desirable that those who have completed all but one or two years of an engineering or other technical course return this fall and finish such course. By so doing they will increase many fold the ultimate service that they can render their country.

UNION OF N. E. W. W. A. AND A. W. W. A. NOT PROBABLE.

For several years past there has been discussed by members of the American and the New England Water Works Association the union of these two societies into one strong national organization, and co-operation along several lines by means of joint committees has fortunately been brought about. Prior to the recent convention of the New England Association, the president sent to members of the American Association a cordial invitation to attend the convention of the sister society. It might have suggested itself that this was a move toward a more formal getting together of the societies, but any such idea was completely dispelled by the president's annual address, in which he said:

With other organizations we will work together gladly and we welcome all water works men to our membership. Careful consideration of our own particular needs and purposes, however, forbids any thought of combination with others.

If the president has expressed the views of the majority of the members of the society (and we believe that such is the case), the door is definitely closed, for the present at least, to consolidation of the two societies. To those who are acquainted with the feelings of the older members, this decision is explained, partially at least, by another paragraph of the president's address:

The past experience of this association, with its avoidance of entangling alliances, is the best guide we can have for the future. Our present position as a power in water department matters shows clearly the wisdom of the founders of this association in rigidly excluding both politics and commercial exploitation from its voting membership.

COST-PLUS-A-FIXED-SUM CONTRACTS.

Last week we called attention editorially to a method of letting contracts for work on a cost-plus-percentage basis. This week we publish a letter briefly outlining a modification of this in which the percentage is graded, decreasing as the total cost of the work increases, with a limit of zero if it should reach a certain predetermined sum. Still another, the "cost-plus-a-fixed-sum" method, is suggested in a recent report by the city engineer of Columbia, S. C., a quotation from which also is given elsewhere.

Concerning the cost-plus-percentage contracts made by the U. S. Government, it may be said that observation indicates a tendency toward high cost of labor on account of the desire of both sides to hurry the work and of the contractor to have all the men possible on the job so as to finish as soon as possible, and not to be exceedingly particular about the amount of work each individual man performs or his competency, number rather than quality being to the advantage of the contractor.

The cost-plus-a-fixed-sum plan reduces the tendency toward crowding the work with incompetent men, since the size of the total payroll has no direct effect upon the

compensation of the contractor. There is no particular incentive, however, toward economical handling of the job, and it is to the contractor's interest to work all the men he can and to keep them on the job during slack periods under some excuse so that they will always be on hand when needed. If the engineer or the city fixes the date of completion of the contract he cannot safely regulate too closely the class and amount of labor employed and the method of execution, and a contractor can make much trouble or delay or expense if he is not satisfied with the manner in which he is regulated, by means which are hard to define or to control.

One suggested modification is the offer to the contractor of a percentage of the saving over the estimated cost. Where bids are received upon the lump-sum plan and also on the cost-plus-a-fixed-sum plan, this modification can be made readily and will give the contractor an incentive to manage his work well and attend closely to all details, where the profits are almost always made or lost. The lump-sum bid under present conditions gives the total cost of the work on the usual plan, plus the factor of safety which the contractor puts on to cover possible increases in cost of labor and trouble in getting materials at agreed prices. The cost-plus-a-fixed-sum bid gives the profit the contractor thinks he is entitled to for the use of his machinery and appliances and his own time, skill and insurance that the work will be satisfactorily completed, without laying the city liable to undue damage or expense from any cause arising out of the prosecution of the work.

If, under the latter plan, the city furnishes the materials, the contractor has no special incentive to be careful of them and may waste considerable amounts by inattention to detail and by too great a desire to have a full supply so that the progress of the work shall not be delayed. If the city should offer the contractor a certain percentage of the amount he could save by constructing the work for less than the lump-sum bid, he would have an incentive to operate the contract in the most economical manner. He should be given the opportunity to make a saving in materials used as well as in labor, whether he or the city furnishes the materials.

The percentage of such prospective saving which the contractor should receive should be determined after a careful study of the circumstances of the particular case. It is not necessary that the percentage should be the same on materials as on labor. Several points are to be considered. If the lump-sum bid is much higher than the engineer's estimate, the contractor's percentage should be less, because the uncertainty is removed. This may affect the percentage of the saving on labor but not that on material, or it may affect both. The amount of control over class and amount of labor, method of execution, and time of completion may affect the profits. Ordinarily the contractor, if as expert as he should be to receive such a contract, can be depended upon to do the work in the most economical way which, to him, will probably mean the quickest way, and the most definite engineer's control provided in the contract should be over the quality of the work, with penalties for waste of material and labor by unauthorized or careless construction.

In states where the contract must go to the lowest bidder, the control provisions in the contract must be much more definite and severe than where the contractor can be chosen for his competency rather than for the low profit which he is willing to work for. Indeed, the chances for success of the cost-plus-a-fixed sum plan are not good if the contract must go to the lowest bidder without reference to his competence. The cost of the work is quite sure to be high and the quality will not be higher than the ability of the contractor. Waste of time and of materials is almost sure to be excessive. Such a contractor could not earn a percentage of a saving because he would not be likely to make any saving if the contract gave the engineer as thorough control of quality of work and method of execution as it should. A thoroughly competent contractor at a higher percentage of profit might actually save the city money in both materials and labor, especially if he receives a reasonable percentage of any saving he may make from a lump-sum bid or engineer's estimate.

It has usually been assumed that the division of the saving should be half to each party, but this is seldom the case, and at the present time it will probably be decided after careful consideration of all the factors in the case, that the contractor's percentage of the saving should be materially less than half, mainly because of the elimination of the uncertainty about future prices and wages.

SEWER CONTRACT ON COST-PLUS-FIXED-SUM BASIS.

In reporting to the city council of Columbia, S. C., recently on the construction of 6¾ miles of sewer, including rock excavation and trestles, city engineer T. Keith Legare made the suggestion quoted below. The city is to receive bids on both lump sum and cost-plus-fixed-sum basis on September 25th.

On account of the unusual and uncertain cost of labor at this time and because of the difficult construction, contractors will probably bid high on this work; therefore, I suggest that the contract be on the basis of cost plus a fixed sum. Under this form of contract the contractor agrees to furnish all labor and complete the entire undertaking by a certain date at its actual cost plus a fixed and stated sum to cover the contractor's profit and other specified items. The contractor is to furnish at his own expense all tools, appliances or machinery necessary or proper for performing and completing the work and to maintain same; also workmen's compensation and public liability insurance. It would be to the contractor's interest to execute the work as quickly as possible, in order that he may earn his commission or profit within the shortest practicable time. Under this plan the city may regulate the class and amount of labor employed and the method of execution. It would be the tendency of the contractor to do the work in the most satisfactory and efficient manner, as his self-interest is involved in that of the city. If the cost of labor should become less at any time, which it probably will in a few months, the city will receive all the benefit therefrom. Proposals should be considered only from contractors experienced in sewer construction and who have the necessary organization and equipment. The city should purchase and furnish the contractor with all material needed for the work.

COST-PLUS-GRADED-PERCENTAGE CONTRACTS.

September 15, 1917.

The Editor, Municipal Journal,
New York City.

Sir: The arguments deduced by you in your editorial on page 257 of your issue of September 13, "Cost-Plus-Percentage Contracts" are sound, but perhaps apply more forcibly to a method of letting contracts other than on a straight cost-plus-percentage basis.

There is a method evolved and advocated by Mr. C. F. Graff, a contractor of Seattle, Wash., which is far more satisfactory than the cost plus a percentage or the cost plus a lump sum basis. It consists essentially in guaranteeing a limiting lump-sum expenditure to the client for the work, at which figure the contractor's profit will be either zero or a minus quantity, and naming as possible actual costs a number of other smaller and regularly decreasing sums with a regularly augmenting sliding scale of percentage thereon to be added for contractor's profit, the latter being so arranged that the client and the contractor will share by another sliding scale the difference between the greatest possible price and the actual cost, the greater the saving the larger the percentage thereof to go to the client. Excepting the lump-sum and unit-price

method, **in normal times** there can be conceived no fairer or more systematically adjusted means of letting contracts than this. The client is protected by bond against excessive expenditure, and the contractor is given the best possible incentive for keeping the cost down to the lowest practicable limit. The client, of course, must be allowed to audit the contractor's accounts, even to the extent of retaining an inspector and auditor on the work from start to finish, to make sure that all payments for labor and materials are **bona fide** and that all the construction is done thoroughly and economically.

The above-mentioned method of letting contracts is described in detail on pages 1584-1586 of Dr. Waddell's "Bridge Engineering," where a contractor's cost and profit table for an actual percentage bid is reproduced with the bidder's detailed description of his proposal.

Yours very truly,

F. H. Frankland,
Associate Engineer,
Waddell & Son, Consulting Engineers.

REDUCING BUFFALO'S WATER WASTE

Material Reduction of Rate of 325 Gallons Per Capita Being Effected by Systematically Locating and Stopping Leaks and Wilful Waste.

Buffalo, N. Y., has for many years led all the cities of the world in at least one respect—possibly in others—its per capita consumption of water has been exceeded by no municipality except possibly a few very small ones where certain unusual contributing conditions affected this rate.

In no year, we believe, has Buffalo's average consumption fallen below 300 gallons per capita. Apparently the city officials were in no way disturbed by the fact that this pre-eminence was costing the taxpayers hundreds of thousands of dollars every year.

With the inauguration of the present commission form of government and the present officials, however, new ideas on the subject seem to have been brought to bear. The officials realized their responsibility for the fact that this large additional expenditure was employed not only in giving the people water to waste at will, but also in paying for negligence on the water department's part in permitting a large part of the water to escape underground through leaks without even giving the taxpayers the satisfaction of hearing it escape continuously through their leaky plumbing fixtures. Consequently the commissioner of the Bureau of Water, George C. Andrews, who was appointed by A. W. Kreinheder, commissioner of public works, after the inauguration of the present commission form of government, determined to discover where such losses occurred, with a view to remedying them, and several months ago the Pitometer Co. was engaged to make a survey of the distribution system. The company a few days ago submitted a progress report of results obtained by the survey conducted in one section of the city.

For the purpose of the investigation the first section was divided into seven districts, each of which was considered separately. The average daily consumption of the entire section was found to be 12,680,000 gallons, with a minimum night rate of 9,824,000, or 78 per cent of the total.

The underground surveys revealed numerous leaks, many of which have already been located and stopped, while others will be as soon as possible. It also served to indicate where house-to-house inspection for waste was most needed, and such inspection has been followed by elimination of much fixture waste and leakage. For instance, in one school house that was closed for the summer the toilets were found to be running continuously at a rate of about 50,000 gallons a day.

A comparison of the total pumpage for the month of August, 1917, with that of August, 1916, shows a reduction in the entire city of 11 million gallons a day. About three millions of this was due to the reduction by about fifty per cent of the amount of water flowing in the 130 horse troughs in the city. Also an increase in meter rates has probably caused a reduction in wilful waste by industrial consumers. But certainly half or more was the direct result of the pitometer survey, and most of the remainder was an indirect result. In the first section alone, leaks have been stopped that gave a measured discharge of 774,000 gallons a day, and an additional 419,000 gallons of leakage has been located. The reduction in pumpage named meant a saving of $2,700 in fuel alone for that month.

In one district there were located 71 underground service leaks and 489 fixture leaks; in another, 56 underground and 667 fixture leaks. In all, 179 underground service leaks had been located up to September 1st. The investigators believe that if the work of discovery and cure be continued for the rest of the year, before next spring the consumption will be reduced by such an amount that one of the pumping stations can be closed down and placed in reserve.

The reduction in cost of pumping is not the only result of the investigation, but the pressure in the mains has been raised also. This is a natural result of the decrease in consumption, but other results of the investigation have contributed. For instance, it was discovered that a gate on a 20-inch line, one of the main feeders of the distribution system, had been closed, probably for years, and opening this added 20 pounds to the pressure.

JOINT LEAKING 100,000 GALLONS A DAY
Did Not Show on the Surface.

The WEEK'S NEWS

State Highway Developments in Virginia, Ohio and Illinois—Activated Sludge Plant for Jersey City—California Plans Big Fight Against Venereal Diseases—Child Hygiene Work Reduces Mortality—Water Measurement in Syracuse—High Bids on San Francisco Aqueduct—Companies Win Little in Indianapolis Surcharge Case—Tacoma Firemen Win Two-Platoon System—Banking City Funds in Tampa—Organizing for Rapid Transit in Cleveland and Cincinnati.

ROADS AND PAVEMENTS

Enforcing of Road Law.

Charleston, W. Va.—The authority of peace officers and county road patrolmen to enforce the several provisions of the new road law was recently set forth in an opinion by the attorney-general in reply to a query from chairman A. D. Williams, of the state road commission: "As a general proposition," attorney general England, says, "sheriffs, deputy sheriffs, constables, justices of the peace, and like officers are conservators of the peace, and as such have all the common law authority of peace officers to make arrests for crimes or misdemeanors committed in their presence." The specific question asked of the attorney general related to the right of these officers to arrest, without a warrant, persons driving motor vehicles without license or without lights, or doing anything else which would be a violation of the road law. That they have this right in regard to offenses committed in their presence is declared in the opinion. "The authority of the road patrolmen," the opinion continues, "is not so clear as that of sheriff and like elected officers who are made conservators of the peace by statute. However, the provision of the road law which says 'such patrolmen shall have general police supervision over all roads within his magisterial district,' would seem to indicate that it was the intention of the legislature to make him a kind of policeman, and I am inclined to the opinion that he would have the right as a police officer to arrest persons violating any provisions of the road laws for which a penalty is provided in the nature of a punishment, or where it is a misdeameanor, without warrant, and take the offender before a justice of the peace for trial."

Ocean to Ocean Highway Mapped.

Colorado Springs, Colo.—The Pike's Peak Ocean to Ocean highway has now completed a new route from the Atlantic to the Pacific coast. The last link in the chain was forged at San Francisco when the national officers in conference with representatives of various California routes selected the Feather River-Sacramento Causeway routes and established the Pacific coast terminus at Oakland and San Francisco. With termini on the Atlantic seaboard both at New York city and Philadelphia, the first prong passes through Newark and Morristown, N. J., Easton and Allentown, Pa., joining with the Philadelphia prong at Reading, Pa., thence continuing westward along the William Penn highway through Harrisburg, Tyrone, Altoona, to Pittsburgh; crossing Ohio through Steubenville, Coschocton, Newark, Columbus, Springfield and Dayton; Indiana through Richmond, Indianapolis, Rockville; Illinois through Decatur, Springfield, Jacksonville, Griggsville; Missouri through Hannibal, Macon, Chillicothe, St. Joseph; Kansas through Hiawatha, Belleville, Norton, Colby, Goodland; Colorado through Burlington, Limon, Colorado Springs, Manitou, Hartsel, Buena Visto, Leadville, Glenwood Springs, Rifle, Meeker; Utah through Vernal, Duchesne, Heber City, Park City, Salt Lake City, Ogden, Brigham, Lucin; Nevada via the Overland Trail through Elko, Winnemucca, Lovelock, Reno; and California through Portola, Quincy, Oroville, Marysville, Sacramento, Martinez, Berkeley, Oakland and San Francisco. The completion of the western extension of the highway followed an official inspection trip made by president C. F. Adams in accordance with the decision of the midsummer meeting held on top of Pike's Peak. Reports made on the inspection trip indicate that less than 10 per cent of the 1,600 miles between Colorado Springs and San Francisco is in poor condition. A campaign is now being conducted to complete the marking of the Pike's Peak trail from coast to coast. The national specifications require red-and-white bands each 10 inches in width, at crossroads, forks and frequent intervals between, these to be painted on telephone poles, fence posts, trees or rocks. In addition, a striking marker design in red-and-white has been adopted and 1,500 enameled steel signs, 14x20 inches in size, are to be placed on individual posts at intervals of not more than five miles between New York and San Francisco. The Pike's Peak Ocean to Ocean highway association was organized at St. Joseph, Missouri, in March, 1914, and has perfected its trans-continental organization through a federation of state divisions, and there is now in each state from New Jersey to California an active division.

Convicts to Make Paving Brick and Road Signs.

Columbus, O.—It is now planned that the convicts in the Ohio penitentiary make the automobile license tags for the state and devote their extra time to making highway signs. These signs may be sold to the political subdivisions of the state at cost. The road signs of Ohio are in very bad condition. The governer has conferred upon the matter with the state board of administration, warden Preston E. Thomas of the penitentiary and with members of the state board of highway advisers. All agreed that the plan shall be carried out if an investigation discloses there is a good chance for success. It is believed that good roads organizations, farmers' associations and automobile clubs will take up the project and help to put it through. The conference agreed upon a method whereby the state will use for highway purposes the brick made by prisoners at the state prison plant at Junction City. This plant has been idle since last fall, but will now be started up at full capacity and will make 28,000 bricks a day. William McClain Arehart, of Roseville, has been named superintendent and a big force of prisoners will be assigned to his direction at once. As 375,000 brick are needed for a mile, the state will be able to turn out enough for two miles of road every month.

Road Fund Distribution in Illinois.

Springfield, Ill.—The funds made available by equal appropriation from the federal government and the state of Illinois have been definitely allotted by the department of public works and buildings, acting in conjunction with the board of highway advisers, as follows: $1,413,000 to the National Trails Old Road, beginning at the Indiana state line and connecting Marshall, Greenup, Effingham, Vandalia, Greenville, Collinsville and East St. Louis; $1,020,000 to the Lincoln Highway, connecting Chicago, Wheaton, Geneva, DeKalb, Rochelle, Dixon, Sterling, Morrison and Fulton; $2,215,000 to the Chicago-Springfield road, connecting Chicago, Joliet, Ottawa, Morris, La Salle, Peoria, Mason City and Springfield; $958,000 to the Springfield-East St. Louis road, connecting Springfield, Carlinville, Staunton, Edwardsville and East St. Louis; $614,000 to the Dixie Highway, connecting Chicago, Chicago Heights, Momence, Watseka and Danville; $400,000 to the road from Chicago to the Wisconsin line, connecting Chicago, Waukegan and Zion City. These allotments cover the amount to be received to and including July 1, 1920, available as follows: July 1, 1917, $1,326,000; July 1, 1918, $1,326,000; July 1, 1919, $1,765,000; July 1, 1920, $2,209,000. It is estimated

that the amounts allotted will pay two-thirds of the cost of the improvement of each road. The counties through which the roads pass will be expected to furnish the remainder of the cost. Construction will not be commenced on any road until a sufficient amount has been so provided to complete the route through its entire length. Preference in starting construction will be given to the roads in the order in which the money for the completion of the entire road is provided. If the people shall approve the $60,000,000 bond issue at the November, 1918, election, those counties contributing to the cost of these roads will be entitled, as provided by law, to reimbursement from that fund for money contributed. The present state aid allotment may be used by the counties to assist in financing these roads and should the state bond issue fail, future state aid allotments may be used to reimburse counties to one-half of the amount contributed. Inasmuch as no part of a road will receive separate consideration, it is suggested that the county officials and others interested effect an organization for carrying out this plan. The division of highways will furnish a representative to be present at such meeting and confer as to the details of the plan.

SEWERAGE AND SANITATION

Important Conviction for Milk Law Violation.

New York, N. Y.—Suspecting that raw milk was being fraudulently labeled and sold as pasteurized milk by a milk dealer of Middle Village, borough of Queens, an inspector of the health department's Bureau of Food and Drugs quietly placed a poster seal on the pasteurizing apparatus and watched what would happen. It was impossible to use the apparatus without breaking the seal. Nevertheless, the seal was found intact the next day, and the second day after, although during this time forty-four cans of milk were sold by the dealer labeled "Pasteurized at Middle Village, 24th day of February, between the hours of 8 and 12 A. M." Moreover, inspection showed conclusively that the apparatus had not been used. The dealer was of course at once criminally prosecuted for violation of the Sanitary Code, the case coming to trial in the Court of Special Sessions, Manhattan. The court found the defendant guilty and imposed a fine of $500.

Propose Activated Sludge Plant.

Jersey City, N. J.—Having submitted to the state board of health plans and specifications for the proposed trunk sewer from Dover to a point below the Boonton dam, city authorities are now proceeding to prepare plans and specifications for the treatment of the sewage effluent to be discharged into the Rockaway River. These plans, as tentatively agreed upon at a meeting of the state board, will provide for the activated sludge system of treatment, which is favored by Jersey City and conditionally indorsed by the engineering department of the state board. It is understood that there will be no opposition of any consequence to the trunk sewer project on the part of any of the municipalities it will traverse or is intended to serve. In transmitting the plans and specifications to the state board, director Fagen of Jersey City's street and public improvement department wrote a letter in which he said: "This department has had under consideration for some time past the various methods of sewage disposal. We have arrived at the conclusion that under all circumstances, the activated sludge method is the one most suitable. As a basis for that conclusion, I beg to submit herewith copy of report made to me by George A. Johnson, sanitary engineer. My reason for submitting to you the proposed plan is that I understand there has been some criticism of the activated sludge experimental plant installed at the Liondale Print Works (at Rockaway). It is Jersey City's desire to secure that type of treatment which above everything else will result in returning to the river the best possible effluent obtainable. Mr. Johnson's advice to me is that the suggested method will secure such a result." Mr. Johnson's letter to director Fagen assigned the following reasons for recommending the use of the activated sludge process: "The effluent obtainable from this process will be highly satisfactory, so far as its physical and chemical characteristics are concerned. Sterlization with chlorine compound will insure high bacterial purity. Low electric current costs at this plant justify the adoption of this process on economic grounds. The sludge resulting from this treatment has a high manurial value and probably can be disposed of at an actual profit to the city." In presenting the plans to the state board, corporation counsel Milton informed the department that within sixty days after approval by the state board plans for carrying on the work would be completed, although actual construction could not begin before next spring. He said construction of the proposed sewer would be undertaken, notwithstanding any litigation in which Jersey City and the East Jersey Water Company might become involved. This presentation of plans by Jersey City marks the apparent conclusion of a problem of more than five years' duration. Originally Jersey City agreed with the municipalities, Wharton, Dover, Rockaway and Boonton, to construct such a system, the towns along the route of the Rockaway River, whose sewage now finds its way to Jersey City's potable water supply, to construct their own laterals. Dover was ready to sign up, but later Rockaway balked, and the change to commission government in Jersey City brought a change of front in that municipality, which later vainly sought to have these towns forced to maintain sewage systems of their own. Jersey City still hopes that it will be able to bring about the reversal of a decision of the Chancery Court eight years ago, when the city was defeated in its endeavor to compel the Jersey City Water Supply Company to construct the sewerage system. The court had previously held that the company, which built the water plant, must construct the sewer system in fulfilment of its contract obligation to give the people of Jersey City a pure and wholesome supply of water. When later the company produced experts to swear that the chlorine treatment would be sufficient to comply with the terms of the contract, the court accepted the evidence and found against the city.

Vigorous Campaign Against Venereal Diseases.

Sacramento, Cal.—The physical examination of every woman arrested on a charge of prostitution, whether she be fined or released, is proposed by the Bureau of Venereal Diseases, which has been established in California by the State Board of Health through the recommendations of the State Welfare Commission. Dr. Wilbur A. Sawyer, secretary of the State Board of Health, has established a central bureau in San Francisco, where he temporarily is in charge, assisted by Dr. A. F. Gillian, newly appointed health officer for the North Coast District. Already the work of co-operating with Federal officers in isolating venereal cases in and around military camps is under way, with the aid of both the army and naval services at San Francisco, Los Angeles and San Diego. Not only will the men be taken care of with a view to safeguarding the interests of the civilian population as well as keeping the soldier's life clean and of high moral character, but women wherever arrested for prostitution will be compelled to submit to the same examination. With the establishing of branch bureaus throughout the state, the State Board of Health expects ultimately to include every section of the state in its campaign to wipe out venereal diseases.

"A Baby Saved Is a Citizen Gained."

New York, N. Y.—That stillbirths can be reduced 22 per cent and deaths of babies during the first month after birth can be reduced 28 per cent is the contention made in a statement issued by the New York Milk Committee. This is based on a report just published of an experiment in the care of expectant mothers covering a period of four years, and the results are compared with corresponding statistics of the borough of Manhattan, New York city, during this period. The report of this effort to prevent deaths of mothers from causes due to pregnancy and confinement, to prevent stillbirths and deaths of infants during the early weeks of life, is issued under the timely caption, "A Baby Saved Is a Citizen Gained." This intensive maternity care program was started in 1912 and continued to the end of 1916. During this period 3,145 expectant mothers were enrolled and given care and supervision averaging 3½ months

before and 1 month after confinement. Each mother was visited in her home every ten days by a specially trained nurse and by a physician whenever it was necessary. Besides this care every mother was given clinical consultation and physical examination and treatment for abnormal conditions before her baby was born, and supervision and care during the first month after her baby was born. When the babies were one month old they were registered at the department of health milk stations. Much attention was also given to co-ordinating the activities of the various agencies whose co-operation and services were needed for the health of the expectant mother and her family. In this period 3,192 babies were born to the 3,145 mothers under observation. Of these 115 were stillbirths and 86 others died during the first month after birth. The stillbirth rate per thousand of these cases was 36 against 46 for the borough of Manhattan or a reduction of 22 per cent. The rate per thousand of deaths under one month was 28 against 39 for the borough, or a reduction of 28 per cent. Out of this whole group of mothers only 5 died, giving a rate of 1.5 per thousand mothers against a rate of 4.9 in the city at large, or a reduction in the maternal mortality rate of 69 per cent.

WATER SUPPLY

Metering Water Mains.

Syracuse, N. Y.—The bureau of water has completed the installation of recording meters on all the mains which distribute water from the Woodland reservoir through the city. Recorders were placed on the two thirty-six-inch mains some months ago and recorders have now been placed on the thirty-inch low pressure main and the twenty-four-inch high pressure, thus completing the set. It is now possible for the bureau's engineer to tell at any moment how much water is being distributed through the city and by the use of the charts to tell at what hours of the day the demand is greatest. The bureau will increase its efforts to keep track of the amount of water from which revenue is received. All regular services, including municipal buildings, are now metered. The only water outlets not now metered are the hydrants and the fire protection services in the manufacturing plants, and it is probable that some means will be devised to measure the amount of water used for fighting fires and for street flushing.

Test Liability for Frozen Pipe Damage.

Reno, Nev.—A suit that will determine the question of whether or not the Reno Power, Light and Water Company is liable for damages for the results of the cold spell which tied up the water system of Reno for forty-three days during January and February of this year has been filed in the district court. Lawrence Devencenzi, former patrolman and now conducting a green house and florist shop, is the plaintiff and the Reno Power, Light and Water company is defendant. Devencenzi asks for a judgment of $5,250, alleging that through the wilful negligence and failure of the company to bury its water pipes to a sufficient depth they froze and he was unable to get water for spraying 3,500 domestic rose bushes. He asserts that through the failure to get water the rose bushes were totally destroyed. His counsel said that the case probably will be transferred to the federal court, the defendant being a company organized and existing under the laws of California and the suit being for a judgment in excess of $1,000. The suit is being watched with considerable interest by scores of Reno people and in case Devencenzi succeeds in establishing the company's liability and secures a judgment there is no doubt that many other suits of a similar nature will be filed.

Bids Fifty Per Cent Over Estimate.

San Francisco, Cal.—The Board of Public Works has opened bids on the construction of about nineteen miles of the aqueduct in the Hetch-Hetchy water supply project. Three important local contracting firms submitted bids, only one firm, however, bidding on all the sections of the work. The bid of R. C. Storrie & Co. was $9,233,671 for all the work The Healy-Tibbitts Construction Co. bid $2,101,950 on Section A, and the Lindgren Co. $5,916,222 on Section C. The city engineer's estimate on the work was $6,090,613, to which was added $216,387 for extra work and engineering, making a total of $6,307,000. The tunnel to be built is 10 feet 3 inches in diameter and the contractor bid about $95 per foot, including accessory structures. The city thought this bid excessive compared with the $59.80 per foot cost of a 12 foot tunnel under Lake Michigan and the 8 foot concrete lined tunnel being driven by the Marin water district at a cost of $29.70 per foot. On the recommendation of the city engineer the Board of Public Works rejected the bids. The high prices of steel and powder and uncertainty in the labor market are said to have been the most important factors in the high bids. The construction of the railroad for hauling materials to the site of the work is nearly completed. The power plant for pounding powder for the construction work is also nearing completion.

STREET LIGHTING AND POWER

Commission Grants Temporary Surcharge.

Indianapolis, Ind.—The Indiana public service commission, acting on petitions of the Indianapolis Light and Heat Company and the Merchants' Heat & Light Company for permission to make a surcharge on all bills for electric light and power during the wartime period of high operating costs, due chiefly to the cost of coal and failure to get coal on contracts, has denied the requests as a whole, but granted a temporary increase in rates to classes of large consumers. The commission refused to permit any surcharge or change of any kind in the rates for electricity to about 50,000 small consumers. Among the large consumers of electricity which the temporary surcharge will affect will be the city of Indianapolis. The company did not include the city in its petition, but the commission decided it was one of the consumers which should be affected. The commission also granted a surcharge of 25 per cent. to be added to all bills for steam and hot water heating for this season, ending next spring. The commission refused to permit any surcharge or charge of any kind to be made on the rates of all who are on suburban lines, and who pay what are known as suburban rates. The commission did, however, grant a horizontal increase on all of the large light and power users of electricity. A surcharge of 5 mills a kilowatt hour is granted for a period extending to the end of the present fiscal year, June 30, 1918. This surcharge will vary in percentage of increase, those for example, having a 5c. rate will be increased 10 per cent. for this period; those having a 2½ a k. w. h. rate will be advanced 20 per cent., and those having lower rates will have higher percentages of advance. It is specifically provided in the order that the present schedule of rates is not to be regarded as changed; that the surcharge is granted only as an addition, to be charged as a separate item for the period ending June 30, 1918—a period which will carry the companies through the heavy winter season, both as to light and heat operations and, which it is hoped, will bridge the period of extraordinary costs of production. The commission finds that the petitioners proved they are facing heavy financial losses and that they are now showing heavy deficits. The commission holds, however, that the petitioners have only proved their case in so far as the cost of production, in which item coal is the largest element. It says that they did not show any material increases in the cost of distribution and other incidentals of the business. For these reasons, if for no others, the commission finds that it would not be justified at this time in levying the surcharge on the small consumers whose 7-cent rates are little influenced by increased costs of coal and other production costs, and whose rates are made high to cover costs of distribution, collections, etc. The city was found to be one of the largest lighting consumers in Indianapolis, and it has on its large contracts a rate of approximately 2½ cents a kilowatt. Legal counsel of the city had extracted from the petitioners a promise that they would not ask the application of a surcharge to the municipal bill, and on this score the city made no appearance at the hearing, and filed no protest or objection on any grounds to the

petition for relief. It is held that any agreement entered into between the city and the petitioners is not binding on the commission, and that there could be, in the working out of justice, and equity, no solution except to include the city in the group of large light and power consumers, on whom the surcharge is authorized. It is further pointed out that the public utility law does not contemplate, and that it specifically prohibits discrimination as among certain classes of users of service. It further appears that notwithstanding the fact that the Merchants' Heat & Light and the Indianapolis Light & Heat companies have surrendered their Indianapolis franchises, and are operating under indeterminate permits, they have continued to pay to the city franchise and gross earning taxes, and that these payments to the city, which will probably aggregate $75,000 during the coming year, will be more than double any temporary relief that is thus provided. In making its estimates on which the decision of the commission is rendered, coal estimates are predicted on the recent prices for coal that have been set by President Wilson.

The commission, in its report, shows that it has conducted independent investigations. It finds that there has come on to the public utilities companies a great load, caused by manufacturers, large building managers, and other large users of power and light, abandoning their own individual power plants. The inquiry showed that this is the result of the high prices of coal and increasing costs of labor and the scarcity of both. The result of this shifting of great industries to the central power station load, has been to decrease by 3 mills the revenue per k. w. h. of the companies—this caused by the great increase in consumption of electric energy at the low or lowest rates which, according to testimony, in some instances are actually "cheaper than the cost of coal itself." "In every instance," the commission says, "the increase is registered principally in the cost of coal; the next item of increase invariably being labor. Other items showing increases are oil, waste and maintenance. This investigation was made in July, 1917, and more recent reports indicate further increases since that period. The Indianapolis users of power, and large consumers of electricity for other purposes who come under low schedule rates, undoubtedly are enjoying an advantage over such competitors and also of the utilities, which, paying war time price of production, are billing electric energy at pre-war prices." The report of the commission contains exhibits of the two companies, in which is given estimate for operations for the year ending June 30, 1918. The estimate for the Merchants' Heat & Light Company shows, without any allowance for dividend or depreciation, a deficit of $218,045. The estimate of the Indianapolis Light and Heat Company shows, without allowance for dividend or depreciation, a deficit of $178,705.01. The report also contains exhibits showing deficits for the last several months. The record shows that both of the companies are operating their hot water and steam service at a heavy loss. The commission says: "The evidence reveals that both petitions rest primarily, but not solely, on failure to get coal on contracts and on resultant advances in the cost of coal, which constitutes at present prices, according to the Merchants' Heat & Light Company, 66 2-3 per cent., and of the Indianapolis Light & Heat Company, 70 per cent. of the cost of kilowatt-hours at the switchboard." The commission, in this regard, says: "It does not intend to be placed in the position of levying on patrons a tax to absolve coal companies or other contractors of their obligations, and the relief granted in no wise shall be taken as making good any losses that might be recoverable from contractors." These two companies, following a petition by most of the other member companies of the Indiana Electric Light Association, had asked for a 30 per cent. surcharge.

Company Found to Operate Without Franchise.

New York, N. Y.—The city has practically admitted that the Edison Electric Illuminating Company, of Brooklyn, is operating in that borough without a franchise. The admission is made by corporaton counsel Lamar Hardy and comes in a modified order restraining the Edison Company from opening streets, laying conduits or stringing wires in the city of New York, with the exception of instances where such work is necessary to carry out its contract with the city. Supreme court justice Scudder, upon the application by counsel for a Brooklyn resident, signed a sweeping restraining order which prohibited commissioner William Willams of the Department of Water Supply, Gas and Electricity and borough president Pounds from further issuing permits to the Edison Company for the purposes of opening the streets. It is the contention of the complainant that the Edison Company possesses no franchise to open the streets or to erect poles or string wires and that, furthermore, it is not entitled to dispense electricity for consumption. This is based upon the claim that the company is incorporated under the Manufacturing Act, chapter 40 of the Laws of 1848, and as such it is not a public service corporation and consequently is not properly incorporated to do the business which it is now carrying on. The Edison Company was not made a party to the action. The modified order which has been issued grants permission to the Edison Company to open streets and do other work in connection with its contract with the city for the lighting of the streets and public buildings.

City Officials to Fight Gas Rate Increase.

Lima, O.—In a report bristling with charges of fraud and misrepresentation, mayor Bailis Simpson and the council finance committee have asked that $10,000 in bonds be voted to fight the Lima Natural Gas Company, which recently asked a raise of five cents per thousand cubic feet. The bond ordinance was passed by a unanimous vote. The report set forth that the gas company obtained a ten-year franchise less than two years ago and practically dictated the terms of the contract; and that the company now was asking a premium to carry out those terms. It also asserted that in an extensive publicity campaign the company had misrepresented the franchise rate for gas in Lima, and in a table of rates in other cities had been guilty of frequent misstatements of fact.

FIRE AND POLICE

Win Two Platoons After Strike Threat.

Tacoma, Wash.—Determined to act unless the city recognized their demands for a two-shift system in the fire department, which would bring a reduction in working hours, firemen in Tacoma signed the "resignation list" of the new city firemen's union, which notified the commissioners that 105 employes would quit work unless the two-shift system was installed. Committees representing the union presented the list of resignations to chief Carlson. They demanded a ten-hour working day, with a night shift of fourteen hours, shifts to change each month. The controversy was settled when a committee of firemen met with the city council and suggested that the present force be divided into two shifts, which will obviate the necessity of forty-one additional men. This was a decided concession, in view of the proposed ordinance asking for an enlargement of the force. Commissioner Pettit said: "In case of fire it would leave only three men, in some cases, to handle as many pieces of apparatus. I'm content for the present, but the enlarged force will have to come sooner or later. The new system is now in effect.

"Movie" Theater Fire Prevent'on Law.

St. Paul, Minn.—Laws passed by the 1917 legislature regulating motion picture theaters have been put into effect by John B. Sanborn, state fire marshal. It is now unlawful for any person to operate a motion picture machine, or to exhibit motion pictures in any theater, hall, or building where the public is admitted, without a license. The licenses are issued by the state fire marshal only after the "movie" theater is thoroughly inspected by the department, and conforms to a number of rigid requirements. The booth in which the projecting machine is installed must be of fire resisting material, and constructed in accordance with specifications outlined in an laws. The law provides for experienced operators of such machines, who must be over 18 years of age and who in the judgment of the deputy inspecting the theater is qualified to operate the machine. The number and loca-

tion of exits, which must be properly marked and illuminated with red lights, also the location and condition of hand extinguishers and other inside fire protection, are provided for.

New Plan for Fire Inspection.

Fitchburg, Mass.—In order that the firemen may become better acquainted with conditions in all parts of the city, an innovation which has proved a decided success has been introduced in the regular monthly inspection of the sections of the city by the fire department. In each of three districts one or two extra firemen from other sections of the city accompanied the one inspector of the district, who usually makes his round alone. This plan gave five men an opportunity to become better acquainted with a district which they are likely to have to fight a fire in at some time, even though their station is not in the section. It is possible to send extra men with the firemen who regularly make the tour of inspection only when none of them are taking their one day in five off, because at that time only is it possible to withdraw a few men without crippling the work of the department. The only time when the one day off in five rule does not hold at the local fire stations comes when the month has a 31st day. On that day all the men are at their posts, and accordingly on only seven days in the year can such a plan be used.

GOVERNMENT AND FINANCE

Mayor Removed by Governor.

Minot, N. D.—The long anticipated order from the chief executive for the removal of W. S. Shaw, president of the Minot city commission, has been issued. The grounds given by the governor for his action are that Shaw knowingly permitted numerous places within the city of Minot to be maintained as places where intoxicating liquors were sold and that he "corruptly connived at the open and notorious maintenance of bawdy houses within the city limits." Assistant attorney general Dan V. Brennan has done practically nothing since his appointment last January other than to procure evidence of Minot's "viciousness," and it is upon his complaint that the governor has acted.

Torrens Title Law in Georgia.

Atlanta, Ga.—That the Torrens land title law, enacted by the legislature just adjourned, will mean more to the landowners of Georgia than any legislation ever passed, is the general opinion here. Under this law an owner of land will be able to register his title, have it certified by the court, and his certificate will be almost like a certificate of stock when he goes to borrow money. It will show at a glance the status of his title and the incumbrances, if any, outstanding, and there will be no necessity, when once he has his title registered, to employ a lawyer to make an abstract. All that is done away with entirely.

Install New Method of Handling Bank Deposits.

Tampa, Fla.—Under plans suggested by city auditor John Hansbrough and approved by the mayor and the finance committee of the council, the city has initiated a new system of handling its bank accounts. Heretofore the city has deposited with only certain banks, but beginning recently its deposits are to be divided among all the banks of the city, and two per cent interest will be required from the banks on the daily balances carried by the city. The city usually for about six months in the year carries a heavy daily balance, and for the remaining six months is a borrower, and heretofore no interest has been charged by the city on large deposits carried with the banks on account of the fact that during the second period of the year the city borrowed money at five per cent. Under the charter the city is permitted to borrow on the tax roll of the year fifty per cent of the amount assessed for any particular fund. The taxes usually come in largely during December and January and during that half of the year large deposits are carried in the banks. Mr. Hansbrough has proposed a system of retiring bond issues and handling funds for bonds that will work a complete revolution over the old methods, it is said. Most of the city bonding has been for fifty year periods, with the option on the part of the city of taking up the bonds at the expiration of thirty years. Under the plan of Mr. Hansbrough these bonds will mature in about twenty-eight years. Every fund now carried works out that way with the exception of the first bond issue, for which the administration of that time did not provide a sinking fund. This bond issue when due must be refunded. All bond issues made during the McKay administration have been provided for by a 2 per cent sinking fund. If the plans of Mr. Hansbrough are undisturbed, it is said, these bonds will be retired on a basis of twenty-eight years or less. Letters were sent out by the city auditor to all the banks in the city proposing the plan which has gone into effect. All the banks have replied agreeing. Under the new system each bank will give bond in the sum of $25,000, with the option of putting up local municipal, county or state bonds for that amount instead of an indemnity bond. The city borrowed $176,500 during the fiscal year ending June 30, on which the interest amounted to $2,731.94 at five per cent, the rate which the city has been paying. The city is now borrowing money from its sinking fund and will use $50,000 from that fund, which means a saving in interest on that amount. Since the present auditor went into office, the bonding debt of the city has grown from $570,500 to $3,150,500, during a period of fourteen years. The city paid a discount of $15,000 on the first bond issue, which sold at 95, the issue being made to provide for street and sewer improvements. On the next issue of $270,500, for refunding, the bonds ostensibly sold for par, but the city paid between $6,000 and $7,000 in commissions for negotiating the sale. Since that issue, it is said, not a cent of commissions has been paid for negotiating a bond issue. The last issue of bonds sold at the highest price in the history of the city, $1.0375. The city now owns $290,000 worth of its own bonds, bought at various times by Mr. Hansbrough, from which the city is deriving $14,500 interest per annum.

Municipal Ownership Charter Amendment Defeated.

Toledo, O.—A charter amendment which would pledge the general credit of the city for municipal ownership bonds has been defeated by a large majority at the primary election. Advocates of municipal ownership believe that this defeat was due to objection to the method provided in the amendment rather than to municipal ownership itself. There was also a question of the power of the council under the amendment. The new section of the charter proposed was as follows: "Nothing in this charter shall be construed to prohibit the city of Toledo from issuing negotiable bonds for the purpose of acquiring, constructing, or extending, any public utility and pledging the general credit and taxing power of the city as security for the same. Such negotiable bonds pledging the general credit and taxing power of the city for the purpose of acquiring, constructing or extending any public utility may be authorized by ordinance initiated by the electors or by resolution or ordinance of the council, subject to the provisions of this charter. In the event that any initiated ordinance, if one there be, fails to fix the amount, terms and form of bonds authorized, the council in such cases, and in all other cases, shall fix the amount, terms and form of all such bonds authorized and shall do, or cause to be done, all other things not expressly authorized, that may be necessary or proper to make such bonds valid and binding obligations for the purpose for which they are authorized." The Toledo Clearing House Association, composed of the local banks, opposed the proposed amendment in paid space in the newspapers. It said: "It is apparently the purpose of the proposed amendment to grant to council powers which it does not now have, and enable it by simple resolution to purchase any public utility and issue bonds therefore in any amount, to any maturity and at any rate of interest, and make the same a general obligation of the city, secured by pledge of the city's entire taxing power which will affect the property of every taxpayer in the city of Toledo. There is sufficient doubt in our opinion as to whether such action of council will be subject to a referendum vote of the taxpayers to make the proposed legislation fraught with very dangerous possibilities to the future finances of the city." A proposal to issue $580,000 worth of general credit bonds for the purpose of extending Summit street received 1,000 less than a majority vote.

TRAFFIC AND TRANSPORTATION

Want Subway Commission for Cleveland.

Cleveland, O.—There has been presented by citizens to the city council an ordinance providing for the appointment of a subway commission by the mayor and the issue of $3,500,000 of bonds for the construction of a subway in West Superior avenue and underground street railway terminals at the Public square. This was accompanied by a petition containing more than the requisite number of names, asking for its submission to the voters, unless approved by council. The ordinance has been referred to the committee on street railways.

Appoints Street Railway Commissioner.

Cincinnati, O.—The Board of Rapid Transit Commissioners has approved mayor Puchta's appointment of C. W. Calkins as city street railway commissioner and he has already assumed his duties. The new commissioner was formerly executive secretary of the local chamber of commerce. His duties will include the administration of the orders of the mayor and the rapid transit commission according to the terms of the rapid transit loop ordinance. He will receive complaints and make recommendations concerning service, and will advise on the subject of extensions and other matters.

MISCELLANEOUS

Municipal Docks for Mobile.

Mobile, Ala.—The voters, by a big majority, have approved the proposition which authorizes the city commission to issue $600,000 worth of bonds for the building of municipal docks. It is planned to construct concrete wharves, piers and bulkheads and railroad connections with the water front structures. Dredging is to be done to a depth of thirty feet. The construction of warehouses is contemplated in the future, but their cost is not included in the $600,000 appropriation.

New Housing Law in Effect.

Sacramento, Cal.—The three new state laws regulating the construction, occupancy and sanitation of tenement or apartment houses, hotels and private dwellings, which were prepared by the State Commission of Immigration and Housing are now effective. The commission's housing bureau is preparing a state housing manual explaining and amplifying the provisions of the laws by cuts, drawings and annotations. In this manner it is hoped to make the laws as readily understood by the layman as by the professional or technical persons who use them. The bureau is also sending out notices to the mayors, health and building departments of the various cities and towns; also to the district attorneys of the various counties directing their attention to the fact that they are charged with the duty of the enforcement of the laws in their respective cities and counties and urging that they see that the laws are consistently and effectively enforced. The state housing commission is authorized to enforce the laws anywhere in the state where city or county officials fail, neglect or refuse to do so. The commission further expects not only to assist the cities and towns in seeing that the laws are uniformly and impartially enforced, but also intends to help the cities in organizing and reorganizing their municipal forces so that a uniform and effective program will be instituted to the end that all places where human beings reside are erected and kept up in conformance to the provisions of the new state housing laws. The housing bureau will also assist the cities in preparing and having enacted by their local legislative bodies building, housing, city planning and zoning ordinances, and will act as a clearing house for all questions that may arise pertaining to the subject. Briefly, the provisions of the new state housing laws fix the minimum size of rooms used for human habitation, provide that they have windows opening to the outer air, fixing the minimum size of windows based in ratio to the floor area; provide for unoccupied spaces; such as yards, courts and a certain percentage of the lot; require that all plumbing be sanitary; fix the minimum number of water closets, slop sinks and similar conveniences, require a given number of stairways, fire escapes and other means of egress for use in case of fire, limit the height of buildings according to the materials used in their construction. The law absolutely prohibits so-called "dark rooms"—i. e., rooms without windows opening to the outer air and stringently restricts the erection of so-called "rear tenements" and "rear hotels"; provide for privacy and cleanliness and sanitation of not only the buildings, but of the surrounding premises. A novel and original method was used in preparing the laws. A year and a half ago the commission completed a very careful investigation of housing conditions throughout the state. This investigation proved the need of practicable and enforceable laws upon the subject. The commission then, with the approval of the governor, invited the fourteen largest cities in the state to participate in a series of conferences for the purpose of studying and discussing all phases of the housing problem and to draft such legislation as was deemed necessary to solve the problem. Twelve of the cities responded by naming official delegates—some thirty in number—including supervisors, councilmen, city attorneys, health, housing and building commissioners and inspectors. A great number of organizations, such as the engineers and architects, city planning and housing associations, chambers of commerce, realty boards, labor and medical organizations and similar bodies joined with the delegates from the cities and the commission in a state housing institute. The institute held four meetings in different parts of the state and carried on an educational program through public addresses and press notices. At these meetings the subject of housing was thoroughly covered. Tentative drafts of the laws prepared by the commission's experts upon the subject were discussed, clause by clause, and as a result the three laws which are soon to become effective were evolved, presented in the legislature and enacted into laws by the legislature.

LEGAL NOTES

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Police Power—Lateral Support.

New York Sup.—Ordinance requiring one making excavations to sheet pile, to prevent removal of lateral support, and to repair all damages, being in harmony with the common-law rule, held valid exercise of city's police power.—Bergen v. Morton Amusement Co., 165 N. Y. S. 348.

Drains—Contamination of Pond.

Wisconsin—Where abutting owners constructed drains on village streets, the village was not liable to a property owner who claimed his ponds and stream were thereby contaminated.—Crystal Spring Brook Trout Hatchery Co. v. Village of Lomira, 162 N. W. 658.

Leasing Public Auditorium.

Minnesota—Where an auditorium in a building erected for municipal purposes is no longer needed for public use and its lease will lighten taxation, the municipality may lease it for private use.—Anderson v. City of Montevideo, 162 N. W. 1073.

Police Power—Sale of Deadly Weapons.

Illinois—A municipal ordinance regulating sale of deadly weapons, and requiring prospective purchasers to secure a permit from chief of police on proof of good moral character, is not invalid because of delegation of legislative authority.—Biffer v. City of Chicago, 116 N. E. 182.

Relative Rights of Vehicles and Pedestrians.

Iowa—The relative rights of vehicles and pedestrians in the public streets are equal, one having no rights superior to the other, save as declared by statute or ordinance, and it is no more the duty of the driver of vehicles to continually look out for pedestrians than of the latter to look out for vehicles.—Rolfs v. Mullins, 162 N. W. 783.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Sept. 18-20.—LEAGUE OF IOWA MUNICIPALITIES. Annual convention, Iowa City. Secretary, Frank G. Pierce, Marshalltown, Ia.

Sept. 18-20.—LEAGUE OF VIRGINIA MUNICIPALITIES. Annual convention, Lynchburg, Va. Secretary, L. C. Brinson, Portsmouth, Va.

Sept. 19-20.—UNION OF ALBERTA MUNICIPALITIES. Annual convention, Calgary, Alberta. Secretary, J. D. Saunders, Camrose, Alberta.

Sept. 24-28.—CALIFORNIA CONFERENCE ON CITY PLANNING. Annual conference, Santa Rosa, Cal. Secretary, Charles H. Cheney, Crocker Building, San Francisco, Cal.

Sept. 24-29.—LEAGUE OF CALIFORNIA MUNICIPALITIES. Annual convention, Santa Rosa, Cal. Secretary, Wm. J. Locke, Pacific Building, San Francisco, Cal.

Sept. 24-29.—THIRD NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES. Exposition, Grand Central Palace, New York City.

Sept. 25-27.—SMOKE PREVENTION ASSOCIATION. Annual convention, Columbus, O. Secretary, Frank A. Chambers, City Hall, Chicago, Ill.

Sept. 25-27.—LEAGUE OF WISCONSIN MUNICIPALITIES. Annual convention, Racine, Wis. Secretary, Ford H. MacGregor, Madison, Wis.

Sept. 27, 28.—CANADIAN PUBLIC HEALTH ASSOCIATION. Annual congress, Ottawa, Ont. Secretary, J. G. Fitzgerald, M. B., Toronto, Ont.

Sept. 27-29.—AMERICAN AND CANADIAN ENGINEERS AND ARCHITECTS OF NORWEGIAN BIRTH OR DESCENT. Informal congress and re-union, Chicago Norske Klub, Chicago, Ill. Chairman, Committee on Arrangements, Joachim G. Glaver, consulting engineer, Chicago, Ill.

Oct. 10.—UNION OF BRITISH COLUMBIA MUNICIPALITIES. Annual convention, Duncan, B. C. Secretary, Ex-Reeve H. Bose, Survey Center, B. C.

Oct. 15-17.—NATIONAL HOUSING ASSOCIATION. Annual conference, Hotel La Salle, Chicago, Ill. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

Oct. 16-19.—LEAGUE OF KANSAS MUNICIPALITIES. Annual convention, Wichita, Kan. Secretary, Homer Talbot, University of Kansas, Lawrence, Kan.

Oct. 17-18.—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

Oct. 17-19.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual meeting, Washington, D. C. Acting Secretary, A. W. Hedrick, 126 Massachusetts Avenue, Boston, Mass.

Oct. 22-24.—AMERICAN CIVIC ASSOCIATION. Annual meeting, St. Louis, Mo. Secretary, Richard B. Watrous, 914 Union Trust building, Washington, D. C.

Oct. 28-30.—TEXAS CONFERENCE ON SOCIAL WELFARE. Annual convention, Houston, Texas

Nov. 19-24.—CITY MANAGERS' ASSOCIATION. Annual meeting, Detroit, Mich. Secretary, W. L. Miller, City Manager, St. Augustine, Fla.

Nov. 20-23.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Recreation Congress, Milwaukee, Wis. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

Nov. 21-24.—NATIONAL MUNICIPAL LEAGUE. Twenty-third annual meeting, Hotel Statler, Detroit, Mich. Secretary, Clinton Rogers Woodruff, 703 North American Bldg., Philadelphia, Pa.

Jan. 15-17.—VIRGINIA GOOD ROADS ASSOCIATION. Seventh annual convention, Richmond, Va. Secretary, C. B. Scott, Richmond, Va.

Feb. 6-13.—FIRST CHICAGO CEMENT MACHINERY AND BUILDING SHOW. Supersedes annual Chicago Cement Show. Held at the Coliseum, under direction of the National Exhibition Co.

Pennsylvania League of Third Class Cities

The annual convention of this league was held at Harrisburg, Pa., August 29 and 30. Erie was selected as the place for the next convention, which will be held in August, 1918. Three cities were willing to have next year's convention, including Hazleton and Coatsville. Fifteen cities favored Erie and four favored Coatsville, and Erie was made the unanimous choice.

The Erie convention will be most important, because at that session the fruits of the work of several special committees created to conduct a campaign to foster and encourage proposed amendments to the commission form of government act will be announced.

Mayor Miles B. Kitts, of Erie, was elected president of the league; Fred H. Gates, city clerk of Williamsport, was re-elected secretary, and William H. Lynch was elected first vice president. R. R. Seaman, city clerk of Harrisburg, was elected treasurer.

A resolution adopted at the closing session of the convention criticises the Legislature for "pickling" the Ramsey bill, which was indorsed and recommended by the league. Twenty-seven honorary vice presidents were elected, including one representative from each city in the league.

The report of the law committee was a resume of the new acts of Assembly. The paper read by City Engineer B. M. Cowden who criticised the method of making street paving assessments, caused a long discussion. Mr. Cowden believes schools, churches and cemetery associations should not be exonerated from paying paving assessments. The convention was so taken with his suggestions that the paper was referred to the law committee with the advice that Mr. Cowden's idea be incorporated in proposed legislation.

Dr. John M. J. Raunick, city health officer, told the convention about food inspection in Harrisburg; the system of levying license taxes and the method of making food tests, and gave much interesting data showing how the capital city traces the source of smallpox and typhoid fever. Mr. Cowden described the workings of the city planning commission of Harrisburg in an interesting paper that showed how the commission is planning for the future growth of the city. This dealt with the commission's rigid enforcement of regulations governing the width of streets and alleys in plots laid out in territory adjacent to the city.

One of the most interesting and instructive addresses was that given by William D. B. Ainey, chairman of the Public Service Commission of Pennsylvania, on "The Relation of Public Utilities to Third Class Cities." He outlined in detail just what service the commission can be to these cities, and expressed the desire for all of the delegates to call at the offices of the commission to further learn of its work. Mayor Kitts, of Erie, told how pleased that city was with the assistance that the commission has given in the past.

"The Workmen's Compensation Law" was the subject of an interesting talk by George C. Klauder, referee of the Workmen's Compensation Board, Philadelphia. He told of the usefulness of this service to cities such as Harrisburg. The other address of the afternoon was given by Cyrus D. Foss, Jr., secretary of the Civil Service Reform Association of Pennsylvania. He spoke on "The Civil Service Administration in Cities of the Third Class." He had a mass of valuable information for the delegates.

An interesting paper was read by James Sweeney, chief of the State Bureau of Standards, dealing with "Weights and Measures," and another by James A. Gardner, chairman of the law committee, but after all the delegates seemed to attach much interest to round table discussions about how they had been baffled by the last Legislature, which ignored their recommendations for proposed new legislation.

International Association of Municipal Electricians

The twenty-second annual convention of the International Association of Municipal Electricians was held at the Cataract House, Niagara Falls, Sept. 11 to 14.

A resolution bearing upon concentric wiring was passed at the close of the second day's session on Wednesday. It was offered by W. H. Flandreau, Mount Vernon, N. Y., a member of the sub-committee on bar grounded-return wiring systems, which reported March 1, last.

The resolution says that such systems have great demonstrated disadvantages and no demonstrated advantages from the standpoints of life and fire hazard as compared with present systems of wiring in this country, and that they do not comply with the rules of the National Electrical Code and the National Electrical Safety Code, which meet in a satisfactory degree all conditions obtaining in this country for the best protection of life and fire hazard conditions in step with the progress of the electrical industry. The association, therefore, unqualifiedly indorsed the findings and report of the electrical industry sub-committee on bare grounded-return wiring systems.

R. A. Smith, Norfok, Va., chairman of the standardization committee, presented a preliminary report. The general plan was indorsed and the committee continued as a permanent standing body. Its report is a comprehensive outline of all the possible activities of a city electrical department, embracing fire alarm, telegraph, police signal telegraph, construction and operation and lighting and power plants.

Among the interesting papers presented at the meeting were: "Phantom Circuit Remote-Control Systems," by H. H. Reeves, General Elec-

tric Company; "Practical City Street Lighting," by Frank J. Dix, Fort Wayne, Ind.; "Renewable Types of Inclosed Fuses," by A. L. Eustice, Economy Fuse & Manufacturing Company; "Police Signaling Systems as Affecting Municipal Electricians," by E. E. Salisbury, Gamewell Fire Alarm Telegraph Company; "Buffalo's New Police Signal System," by Gustave F. C. Bauer; "The Growing Tendency Toward Surface Wiring for the Sake of Flexibility and Economy in Many Classes of Buildings," by C. W. Abbott, American Conduit Manufacturing Company, Pittsburgh; "Fire Hazards of Domestic Electrical Appliances," by W. J. Canada, Bureau of Standards, and "Common Battery Service Operating Fire Alarm Circuits," by J. B. Yeakle, Baltimore, Md.

League of California Municipalities.

The twentieth annual convention of this league will be held at Santa Rosa, Cal., September 24 to 28. The program should be of much interest to municipal officers and workers. The program follows:

Gov. Wm. D. Stephens, of California, on Tuesday morning will talk on better municipal government. In the afternoon, Max Thelen, President of the California Railroad Commission, will speak on "Grade Crossings Within Municipalities." At this session the actual accomplishments of California City Planning Commissions will be set forth in reports of officials of the California Conference on City Planning, which will hold its annual meeting at Santa Rosa during the same period.

At the session of engineers, councilmen and street superintendents on Wednesday morning, there will be talks by exhibitors, followed by addresses, including "Redding's New Lighting System," by E. A. Rolison, City Electrician, and a symposium on "The Advantage of Planting Flowers Instead of Grass in Parking Spaces."

"The Police Power and Control of

(*Continued on page 300.*)

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

A WATERWORKS SYSTEM is to be built by Port Dover, Ont. The engineers for the improvement are James, Louden & Hertzberg, Excelsior Life building, Toronto, Ont.

WATERWORKS improvements to cost $150,000 are to be made by Wooster, O. The consulting engineering work is done by J. W. Sherman Co., 513 Nasby building, Toledo, O.

A WATERWORKS SYSTEM to cost about $158,000 is to be built by Pasco, Wash. Plans for the improvement are being prepared by Sawyer Bros., White building, Seattle, Wash.

Ebensburg, Pa., is receiving bids on a reinforced CONCRETE ARCH BRIDGE. Plans and specifications were prepared by J. L. Elder, Jr., Ebensburg.

A new BRIDGE is to be built by Watertown, N. Y. Plans and specifications have been prepared by the Concrete Steel Engineering Co., Park Row building, New York, N. Y.

Stratford, Conn., is building SEWERS and a SEWAGE DISPOSAL PLANT. The engineer for the improvements is Clyde Potts, 30 Church Street, New York, N. Y.

WATERWORKS IMPROVEMENTS are to be made by Waurika, Okla. The engineers for the work are the Mackintosh-Walton Engineering Co., 1023 State National Bank building, Oklahoma City, Okla.

Hennepin and Dakota counties, Minn., plan to spend $425,000 on a BRIDGE and HIGHWAY IMPROVEMENTS. Plans and specifications are being prepared by the Tolz Engineering Co., 1410 Pioneer building, St. Paul, Minn.

A SEWER SYSTEM will be constructed by private parties in Elgin, Texas. Henry Exall Elrod, Dallas, has been retained as consulting engineer.

PAVING IMPROVEMENTS are to be made by East View, O. The engineers for the work are the F. A. Pease Engineering Co., 802 Marshall building, Cleveland, O.

Extensions and improvements to its WATERWORKS are proposed for San Bernardino, Cal., and being planned by F. C. Finkle, 448 Hellman building, Los Angeles, Cal.

A WATERWORKS SYSTEM is to be built by North McGregor, Ia. Plans and specifications were prepared by David G. Fisher & Co., 213 Whitaker building, Davenport, Ia.

A new FILTRATION PLANT is proposed by Newark, O. Plans and specifications are to be prepared by F. A. Barbour, 73 Tremont street, Boston, Mass.

Norwood, Ont., is to build a new BRIDGE. Plans and specifications for the structure were prepared by Bowman & Connor, 31 Queen Street, W. Toronto.

The village of Rice, Minn., is to construct an ELECTRIC DISTRIBUTION SYSTEM and transmission line. The consulting engineer for the improvement is Earle D. Jackson, Capital Bank Building, St. Paul, Minn.

Extensive improvements to cost $2,000,000, including a CITY PLAN development, a bridge, sewer system, sea wall and water front improvements, are proposed for St. Augustine, Fla. The American Park Builders, 140 S. Dearborn street, Chicago, Ill., are the architects for the projects.

PERSONALS

Beck, James P., general manager of the Portland Cement Association, with headquarters at 111 West Washington street, Chicago, died September 8 in Chicago. Mr. Beck was a little past 31 years of age, having been born January 27, 1886, at Odell, Ill. Mr. Beck was graduated from the University of Illinois in 1907 with the degree A.B., in L. and A. On his graduation he entered the employ of the Universal Portland Cement Co.—to be precise, in June, 1907. Two years later he was made publicity manager of that company by Edward M. Hagar, then president of the Universal Portland Cement Company. Edward M. Hagar, who originated the Cement Products Exhibition Co., while one of the cement shows was being planned, became too ill to attend to details and transferred the responsibility to Mr. Beck. His first as well as following efforts to make the Cement Products Exhibition Co. a success were noteworthy. Mr. Beck was also a prime mover in the two national conferences which were held in Chicago, known as the National Conference on Concrete Road Building. During the fall of 1915 Mr. Beck was chosen to formulate plans for broadening the scope of work of the Association of American Portland Cement Manufacturers, the headquarters of which were then in Philadelphia. After several months' work Mr. Beck submitted at the annual meeting of the association in December, 1915, a very comprehensive plan which was adopted essentialy in its entirety. Mr. Beck was then made general manager of the association to put into effect and carry out the plan which he formulated. He was a member of many clubs, associations and fraternities, among which were the following: Advertising Association of Chicago, Cement Products Exhibition Co., American Concrete Institute and American Society for Testing Materials.

Bowers, George W., assistant engineer of construction of the Cleveland water works, has obtained leave of absence to act as engineer in charge of water supply works under R. Winthrop Pratt. Mr. Pratt is consulting engineer for the government at Camp Sherman, Chillicothe, Ohio.

Brensinger, George F., city commissioner of Jersey City, vice-mayor and head of the department of revenue and finance, was killed in an automobile accident, Sept. 11.

Smith, E. J., for the past eighteen months in charge of highway work in Meigs county, Tenn., has been placed in charge of highway work in Fentress and Morgan counties.

Thomas, Prof. Robert G., has been appointed a member of the South Carolina Highway Commission.

Whitney, R. E., formerly with Weston & Sampson, has been appointed to a first lieutenant.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

TAPPING MACHINES

"Pressure" and "Dry" Outfits of Improved Design

The Lennox improved pressure tapping machine is designed for tapping water, gas and other mains under pressure, the cocks and plugs being inserted without lessening or removing the pressure in the pipes. After the machine is fastened on the main no disconnecting or changing is necessary until the work is completed. The tap is made and the cock placed in position without the necessity of taking any portion of the machine apart.

An even more difficult job may be easily performed with this machine. A small cock can be taken out, the size of the hole increased, and a larger cock inserted by screwing in the plug while the change is made.

The machine is provided with gear and pinion, thus permitting it to be readily turned to place under the heaviest pressure. It has no extra parts for high pressure, but is so arranged that there is no waste of water, the gasket between the saddle and the machine making it water-tight. A very valuable feature is the screw plug for holding corporation cock, which is so constructed that it is impossible for the cock to drop off.

A tapping machine is constantly transported from one piece of work to another, and must, therefore, be of light construction but sufficient strength to withstand heavy pressure. This machine is claimed to combine both requisites without sacrificing the essential demands in either case.

Durability is the outstanding feature of the design, and as the machine is composed of very few parts the necessity of repairs is much reduced. Any size pipe, from two inches to thirty inches can be tapped, and the machine will operate on the mains in any position, top, bottom or sides.

In the "Special" dry tapping machine are particularly featured simple construction and design, easy operation and durability. This machine has a double standard, with sliding cross-head or yoke supporting the tap. All parts are thus subjected to equal pressure and the tap being centrally located the possibility of its springing out of line, which is a frequent occurrence with machines clamped on one side, is prevented. The dimensions and design of the dry tapping machine have been adapted to the standard taps; these are the same as are used in the pressure tapping machine, rendering the taps interchangeable and thereby saving the expense of supplying different taps for each machine.

In operation, over the point where tap is to be made are assembled the large rubber gasket, saddle, small rubber gasket and body of machine. The chain is arranged for holding in place and the nuts drawn tight to prevent leaks. The combined drill and tap, safety plug and screw plug with corporation cock are inserted into the stuffing boxes of the three outer holes in cap or upper portion of machine. The large leather gasket is fitted into the machined groove in cap and put cap in place. The pinion is placed in mesh with teeth of cap. The yoke is assembled with feed screw in place. The cap is rotated until combined drill and tap is over point where tap is to be made, when index pin will engage slot in cap. The cap is secured to body by stud-nut screwed on to stud at center of cap, placing flat leather washer between stud-nut and cap.

The wrench is put in position on drill and tap, the yoke raised, feed screw set down; it being noted how far to feed to get sufficient thread for corporation cock. After hole has been drilled and tapped the feed screw is loosened to release its point from center of tool, the yoke swung and tool raised to clear hole. The cap is rotated until safety plug or corporation cock, as desired, automatically indexes over tapped hole and screwed in to complete tap. The machine is released by simply loosening chain.

The accompanying illustration shows the pressure tapping machine. It is made by the Lennox Machine Company, 2558 W. 16th street, Chicago, Ill., and Marshalltown, Ia.

"RAPID" CAR LOADER

For the Economical Handling of Construction Materials

The shovel method of unloading construction materials from railroad cars to wagons and trucks is rapidly giving away to mechanical methods because of the slowness and expensiveness of the more primitive way. The Rapid loader is designed to overcome contractor's difficulties with scarce and expensive labor. It is built for rapid and economical handling of sand, gravel, crushed stone, coal, cinders, cement or other materials from railroad cars, gravel pits, cinder piles and coal yards.

The loader is designed that it tips easily and returns to position automatically by gravity. It can be so placed that it will clear any standard vehicle when it is used to load wagons from railroad cars. It is in two parts and is light enough so that two men can handle it easily. It is claimed to be so economical of operation that it requires the handling of only about 300 cubic yards of crushed stone or gravel out of railroad cars to pay for one loader by the saving which it can make in this time over the old methods of holding the team while shoveling into the wagon.

There is also a saving in material, which is frequently wasted in the shoveling method by being spilt by badly aimed shovel loads. There is also no time wasted by the men in looking over the car side to see if they are pitching into the wagon.

The device is made entirely of steel and is claimed to be practically indestructible—but as light as is consistent with proper strength and durability. The two parts in which it is made are separable, and the device is easily and quickly put into place or taken down. There are no hinges, latches or doors to get bent and out of shape. The outfit is built in three styles: one,

THREE VIEWS OF "RAPID" CAR UNLOADER AT WORK.

one and one-quarter and one and one-half yard capacities.

The accompanying illustrations show the Rapid loader in action. It is a product of the Bonney Supply Company, Inc., 371 St. Paul street, Rochester, N. Y., which also makes the Rapid sand and gravel washer.

INDUSTRIAL NEWS

Cast-Iron Pipe.—Prices still remain at their high level of the last few weeks. The general inactivity in orders and construction continues. Quotations: Chicago, 4-inch Class B and heavier, $68.50; 6-inch, $65.50. New York, 4-inch, class B and heavier, $68.50; 6-inch, $65.50. Birmingham, 4-inch, Class B and heavier, $63; 6-inch, $60; class A, $1 extra.

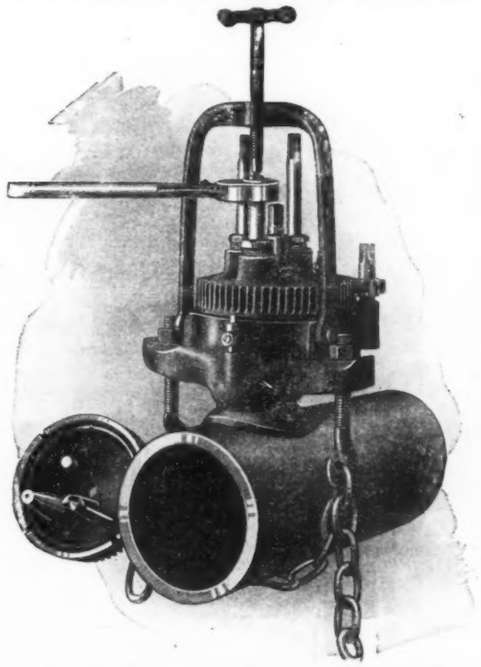
The Asbestos Protected Metal Company, Pittsburgh, Pa., announces the opening of a sales office in the Union Central Building, Cincinnati, under the direction of Mr. J. C. Lathrop.

The Wyckoff Pipe and Creosoting Co., Inc., 30 East 42nd street, New York, N. Y., announces that it has furnished over a million feet of conduit to the Bell Telephone Companies this year, for placing their wires underground in many localities throughout the United States. It is stated that an examination of the lines that have been put in for the different companies show no signs of decay after having been underground for over thirty years.

The Thompson Electric Company, 5606 Euclid Avenue, Cleveland, Ohio, is distributing a new bulletin, supplementary to catalogue B-16, describing its safety disconnecting hanger.

The Michigan Water Pipe Company, Bay City, Mich., has published a very neatly and interestingly prepared catalog describing and illustrating its "Michigan" combination steel and wood water pipe. The manufacture of the pipe is clearly described and the uses enumerated in detail. The lasting qualities of wood pipe are emphasized. Seventeen reasons for the use of this wood pipe are given, as follows: 1—Durability, 2—Sanitation, 3—20 per cent more capacity, 4—Simplicity in handling, 5—Light in weight, 6—Speed in laying, 7—Protects against freezing, 8—Not affected by electrolysis, 9—Rigid inspection of materials, 10—Efficient construction of stave, 11—Strength for steel banding, 12—Protection of banding, with asphaltum, 13—Cannot burst under extreme pressure, 14—Can be laid in a wet trench, 15—Short curves without specials, 16—Low installation and maintenance cost, 17—Responsibility of company. The service of wood pipe in municipal water supply systems and in hydro-electric plants is shown in a number of examples. Valuable technical data on wood pipe and on steam heating are a feature of the catalog. On the whole, this book should prove a useful and interesting addition to the library of contractors, engineers, waterworks men and others interested in the field.

The American-La France Fire Engine Co., Inc., Elmira, N. Y., announces the shipment of the following orders: Bridgeport, Conn., type 14 combination city service truck—San Gabriel, Cal., type 12 combination with junior pump—Syracuse, N, Y., triple combination piston pumper and hose car—Stockton, Cal., type 12 combination chemical engine, a hose car—Steelton, Pa., two type 12 combinations with junior pumps—Scarsdale, N. Y., type 14 combination service truck—Scarsdale, N. Y., type 10 triple combination chemical engine and hose car—West Park, Ohio, type 12 triple combination chemical engine and hose car—Albany, N. Y., Brockway combination—Watch Hill, R. I., type 75 triple—Philadelphia, Pa., type 10 salvage corps car—Rome, N. Y., type 10 chassis—Atlantic Highlands, N. J., type 40 combination with junior pump—



LENNOX PRESSURE TAPPING MACHINE.

Baltimore, Md., type 12 triple—Long Branch, N. J., type 12 chemical engine with junior pump—Coal Township, Pa., type 12 combination pumping engine and hose car—Huntington, Pa., type 12 triple—LaCrosse, Wis., type 14 city service truck—Syracuse, N. Y., type 12 combination chemical engine and hose car—Groton, Conn., triple combination chemical engine and hose car—Charles City, Ia., type 40 combination with junior pump—Kane, Pa., type 40 triple combination chemical engine and hose car—Irwin, Pa., type 12 combination with 500 gal. pump—St. Clair, Pa., Brockway type D combination—Wrightstown, N. J., 3 type 76-b pumping engines and hose cars—Steelton, Pa., type 14 combination service truck—Lockport, N. Y., Brockway type D chassis—Salem, Mass., type 40 combination with junior pump.

The Portland Cement Association, 111 West Washington street, Chicago, Ill., announces that H. E. Hilts, formerly district engineer at San Francisco for the association, has been elected by the board of directors to succeed the late Mr. J. P. Beck as general manager. Mr. Hilts was born in New York and obtained his technical and engineering education at the University of Pennsylvania. His first work was as rodman with the Mexican International Railroad. Later he was in the employ of the Philadelphia and Western Railroad. For two years he was instructor in the engineering department of the University of Pennsylvania, after which he entered the service of the New York Central Railroad, leaving that company to become associated with the Portland Cement Association as road engineer in 1913, for territory comprising the New England and Northeastern States, having been stationed at Albany and Easton, Pennsylvania. In 1915 he was appointed district engineer at San Francisco. Mr. Hilts is an associate member of the American Society of Civil Engineers, member of American Society for Testing Materials, associate member of the American Railway Engineering Association and also a member of the American Concrete Institute.

The Goodyear Tire and Rubber Company, Akron, O., has recently been kept busy answering the many queries that have come from all parts of the country as to the success of the Akron-Boston motor transportation line established several months ago, by the addition of three trucks to the pioneer Packard which has been operating on a regular seven-day schedule since last April, thus forming a fleet of four. Although probably the pioneer truck in a new transportation era, the big five-ton Packard, which has been hauling tires to the company's eastern branches, returning laden with tire fabric from the Goodyear Cotton Mills at Goodyear, Conn., has already become a commonplace, and a fixture, along the Lincoln Highway and Boston Post Road. At first there was a disposition to regard the innovation as a publicity measure, but the steady plugging of the big Packard truck along the route on a regular schedule soon convinced all the doubting ones that the new project was not a tire advertising venture, but a commercial transportation enterprise. The fleet consists of two Whites and two Packards. Although speeds of 20 miles per hour may be attained with the three-ton trucks and 30 miles with the five-ton machines, the schedule is based on an average of 10 miles per hour, including stops for meals, motor supplies, etc. The big cord tires used on these trucks are claimed to have opened up a new field for transportation lines. Many trucks

that have been plugging away on solid tires at slow speeds may now double their speed on pneumatics, with both tire wear and gasoline consumption materially reduced, according to the Goodyear accounts.

NEWS OF THE SOCIETIES

(*Continued from page 297.*)

Streets by the Governing Bodies of Municipalities of This State," "Some Interesting Problems Confronting a New Municipality," and "Establishment of Grades in Street Improvement Work" will be handled respectively by City Attorneys W. P. Butcher, of Santa Barbara; John J. Mazza, of Corte Madera, and D. J. Hall, of Richmond, on Wednesday morning, at the session of the department of city attorneys. A number of other interesting topics will be heard during the morning, including a symposium—"Keeping the Records Under the '1915 Bond Act.'"

Thursday's sessions will include the following: "How Santa Rosa Did Its Own Street Paving," D. W. Cozad, street commissioner of Santa Rosa; "Wasting Money on Street Pavements," D. W. Perry, city councilman of San Anselmo; "Experience of the Highway Commission with Different Types of Pavement"; "The Comparative Cost of Oil Macadam with Pavement Having a Cement Concrete Base"; "Liability of a City for Trees and Other Obstruction in Streets," city attorneys of Palo Alto and Alameda; "Disposition of Fines Under the Motor Vehicle Act"; "The Limit of the Discretion Allowable to the Superintendent of Streets in Specifications for Street Improvement Under the Improvement Acts," Geo. A. Work, city attorney of Rio Vista; "The Policy of Using Sign Posts or Iron Buttons at Street Intersections," a symposium, and "How the League May Increase Its Benefits to Municipalities," a symposium.

The convention will be brought to a close on Friday by the election of officers, selection of next meeting place, and other business. There will be a barbecue aat Asti Friday afternoon, after an automobile trip.

New Jersey State Firemen's Association

War relief measures in the cases of firemen's families who may be affected by military service will be discussed September 21 at the annual convention of the New Jersey State Firemen's Association to be held at Atlantic City. Liberality will be urged by the executive committee, Bird W. Spencer, president, which will state in its annual report:

"Our funds cannot be used in a better cause than to encourage the display of bravery in the defense of our country and the institutions of civilization, liberty and democracy to which it and we stand pledged, and that should there be any question of the right to grant the relief sought, to at once ask the advice of our counsel, who will resolve every doubt in favor of giving relief."

Another recommendation of the committee will be the voting of the association's complete support of the administration in its war policy.

Of particular interest to the delegates will be the report of the legislative committee, which will bring up questions of membership competency and the administration of funds of the benefit bodies making up the association. These now number 306, a gain over last year of six. Of the funds in the hands of the commissioner of banking and insurance, it is reported, $20,000 was paid for the support and use of the Firemen's Home at Boonton and $230.24 to each relief association. This is the largest distribution in the association's history.

National Highway Association, Piedmont Division.

One hundred good roads advocates from North Carolina and Virginia met at Lynchburg, Va., August 27, and formed the Piedmont division of the Bankhead National Highway association, which proposes to improve the Sand Hill section of the route between Atlanta and Lynchburg. The officers are:

W. R. Lynch, Fieldale, Va., president; D. B. Ryland, Lynchburg, Va., vice-president. Executive committee—L. T. Hartsell, Concord, N. C.; R. L. Dibrell, Danville, Va.; R. P. Richardson, Reidsville, N. C.; W. H. Burton, Spencer, N. C.; Zeb Vance Walser, Lexington, N. C.; N. H. Woodson, Salisbury, N. C.; Walter Fauntleroy, Alta Vista, Va.; Colonel Panell Rucker, Martinsville, Va.; Dr. Wm. Tunstall, Lovingston, Va.; C. M. Van Story, Greensboro, N. C.; O. L. McCraw, Lynchburg, Va.; A. E. Strode, Amherst, Va.

The Municipal Engineers of the City of New York

At the meeting in the Engineering Societies' Building at 8:15 P. M., on Wednesday, September 26, 1917, a paper entitled "Reconstruction and Diversion of Sewers on Account of New York Subways" will be presented by Samuel D. Bleich, Assistant Division Engineer, Public Service Commission. A discussion of this paper will also be presented by Joseph L. Hunt, Assistant Division Engineer, Public Service Commission. Both paper and discussion will be illustrated by lantern slides.

Trans-Allegheny Good Roads Association

At the annual meeting held at White Sulphur Springs, W. Va., Sept. 9, the convention re-elected all the old officers, as follows: George W. Stevens, Richmond, president; W. A. MacCorkle, Charleston, vice president; A. S. Johnston, Union, secretary, and Decatur Axtel, Richmond, treasurer.

Addresses on good roads were made by former Gov. William A. MacCorkle, President George W. Stevens of the Chesapeake & Ohio Railroad, and others. Reports were received from the following counties: T. S. Scanlon, for Cabell; J. T. Garrett, for Pitman; M. P. Malcolm, for Kanawha; Leslie Bayliss, for Fayette; E. D. Williams, for Summers; J. W. Johnson, for Monroe; S. W. Hinkle, J. S. McWhorter, E. D. Smoot and John C. Dice, for Greenbrier; J. T. McGinniss and C. L. Scott, for Raleigh.

From these reports it was shown that of the 70 miles of Midland Trail between the Virginia and Kentucky state lines, 113 are already constructed. Committees will be named later in each district to forward the work of building the connecting links.

Providence Engineering Society

The meeting on "Municipal Engineering" of the society will be held 8:00 P. M., Sept. 26. Dr. Francis A. Carmelia of the United States Public Health Service will address the section in the Society rooms at 8:00 P. M., on "Sanitary Conditions of Narragansett Bay."

The paper will be discussed by Stephen DeM. Gage, Chemist and Sanitary Engineer of the State Board of Health, and by C. N. Harrub, Sanitary Engineer of the United States Public Health Service.

New York State Civil Service, October 6, 1917.

Open competitive examinations for the following positions in the state service will be held throughout the state on the date mentioned above. Candidates should apply to the "State Civil Service Commission, Albany, N. Y.," for the proper application forms. No application forms will be sent out by mail after September 24, and none returned will be accepted if received at the office of the commission after September 26.

251. INSPECTOR, State Department of Health. $1,260. Men only. Two registers will be established; the first will be a list of those qualified in general sanitary and milk inspection, and the second, a list of those qualified in building construction of county tuberculosis hospitals. The department desires to appoint one sanitary milk inspector and two building construction inspectors, and applicants for the latter position should be qualified to inspect the construction of county tuberculosis hospitals, to read architects' blue prints and specifications, and to check up the construction with the drawings and specifications. Subjects of examination and relative weights: Questions pertaining to the duties of the position, 2; education, experience and personal qualifications, 3. Candidates may be summoned for an interview with the examiners.

255. CHIEF OF DIVISION, Bureau of Statistics and Accounts, Public Service Commission for the First District. $3,001 to $5,000 a year. Open to men only. The duties of the position require familiarity with the economic principles applicable to the determination of rates and charges, the classification of accounts and the supervision of security issues of public utility companies. Candidates must therefore submit evidence of the possession of a thorough knowledge of corporate finance, accounting theory and practice (with special reference to the system of accounts prescribed by the Public Service Commission), and statistical theory and method; also evidence of ability to supervise the work of statisticians and accountants in a comprehensive investigation of corporate accounting and finances. Candidates will not be required to appear at any place for examination, but will be rated on their training, professional and personal records and submitted papers, including published writings. They may also be summoned for an interview with the examiners.

257. ASSISTANT CONSTRUCTION ENGINEER, Commission on New Prisons. $1,800 to $3,000. Twelve years' experience in construction of buildings and engineering works required. One appointment at maximum salary and others at lower salaries expected. Persons desiring to take this examination should write to the commission for special circular of information.